Epidemic Intelligence Service
51st Annual Conference

April 22–26, 2002

Centers for Disease Control and Prevention

Atlanta, Georgia

Contents

Scientific Program Committee

Jeffrey Sacks, *2002 Committee Co-Chair*
James P. Alexander, *2002 Committee Co-Chair*
Richard Besser, *Co-Chair, Mackel Award*
Mary Reichler, *Chair, Latebreaker Committee*
Megan Davies, *Chair, Poster Sessions*
Erica Lowe, *EPO Liaison*

Representatives, Centers/Institute/Offices

Andrea G. Winquist, *Epidemiology Program Office*
Susan Shober, *National Center for Health Statistics*
Richard E. Besser, *National Center for Infectious Diseases*
Jinan Saaddine, *National Center for Chronic Disease Prevention and Health Promotion*
Margaret A. (Peggy) Honein, *National Center for Birth Defects and Developmental Disabilities*
Megan Davies, *National Center for Injury Prevention and Control*
Randolph Daley, *National Center for Environmental Health*
Elena Page, *National Institute for Occupational Safety and Health*
Abigail Shefer, *National Immunization Program*
Mary R. Reichler, *National Center for HIV, STD, and TB Prevention*

Program Production

James P. Alexander, Patsy Bellamy, Deborah Gould, Beverly Holland, Erica Lowe, Julie Schuitema
Epidemiology Program Office

The Epidemiology Program Office gratefully acknowledges the invaluable assistance and cooperation of the Management Analysis and Services Office and the editorial and support staffs of all CDC administrative units participating in the 2002 EIS Conference.

Color Key for Name Tags

Blue ..... EIS Alumni/ae
Green ..... Current EIS Officers
Red ..... EIS Recruits
Black ..... Guests
Purple ..... Conference Staff

Yellow Star ..... Field EIS
Orange Dot ..... Recruiters
Pink Dot ..... Media

PREFACE

Dear Friends of EIS:

Welcome to another exciting event—the 51st Annual Epidemic Intelligence Service Conference. We are delighted that you are able to attend our annual conference, which highlights the professional activities of EIS Officers. The scientific program this year includes 78 oral presentations and 32 poster presentations. In addition, your experience this week will be enriched by International Night, the EIS skit, the Prediction Run, special award presentations, and other activities that have long been a tradition in the EIS Conference.

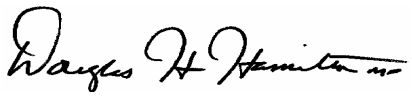
As you undoubtedly know this has been an incredibly busy year for the EIS program. The year started out with a number of celebratory activities designed to mark the 50th anniversary of the EIS program. The largest activity was last year's EIS conference, with several other activities planned for later in the year. September 11 brought those plans to a screeching halt as EIS Officers were once again called upon to serve as the lead elements of CDC's response to a public health crisis. Within a week of the attacks on the World Trade Center (WTC), 50 EIS Officers had been deployed to New York City to help establish an emergency surveillance system. Since September 11, 136 EIS Officers have been deployed to respond to the WTC and later anthrax attacks. Many Officers were sent out more than once, some as many as four different times. Although this emergency response has been the primary focus of the EIS program for the last several months, EIS Officers have continued to respond to a broad range of public health issues.

One impact of the visibility of the EIS Officers in the response to September 11 has been an increased recognition of the importance of trained epidemiologists in a public health emergency. Congress has responded by providing funds to increase the size of the EIS class. These increases will be targeted to put additional Officers in field assignments where they will help increase the capacity of state and local health departments to respond to public health emergencies. As I write this Preface, we have still not completely filled the class. While I can't yet report a specific class size, I can say that it will be the largest EIS class ever.

Therefore, we extend a special welcome to the incoming 89 (and counting) members of the EIS Class of 2002. The class is composed of a select group of men and women with a broad array of interests and skills. Fifty-six (63%) of the new Officers are women, and 15 (17%) are citizens of other nations. Among the 74 who are U.S. citizens, 26 (35%) represent racial and ethnic minority groups. The class includes 56 physicians, 24 doctoral level scientists, 7 veterinarians, 1 nurse, and 1 dentist.

One highlight of this year's conference is a special session on Tuesday afternoon focusing on developing international capacity in applied epidemiology. This session will feature presentations by members of TEPHINET (Training programs in Epidemiology and Public Health Interventions NETwork) and by EIS alumni/ae. This theme will continue during the International Night program when there will be reports by trainees from Brazil, Vietnam, Uganda, Peru, the Philippines, and the United States.

The 2002 Conference provides you with the opportunity to hear about many current applications of epidemiology to public health and prevention by EIS Officers. We welcome you to an exciting series of days and evenings in the EIS experience, an opportunity to learn, to meet old and new friends, and to welcome the incoming Officers. I look forward to seeing you during the week.



Douglas Hamilton, MD, PhD
Director, Epidemic Intelligence Service
Division of Applied Public Health Training
Epidemiology Program Office

The 52nd Annual EIS Conference is scheduled for March 31st – April 4th, 2003.

Mark your calendars now!

2002 EIS Conference — Schedule

— Monday, April 22, 2002 —

7:30a Registration Desk Opens

8:15a WELCOME AND CALL TO ORDER – Stephen B. Thacker, Director, Epidemiology Program Office

8:30a Session A: EIS in Action. Moderator: David W. Fleming

8:35 Investigation of the First Identified Bioterrorism-Related Anthrax Case in the United States C Palm Beach County, Florida, 2001. *Marc S. Traeger* (Note: Mackel Award Finalist)

8:55 Association Between Family History of Colorectal Cancer and Preventive Health Behaviors in Women C United States, 1997. *Jill M. Morris*

9:15 Evaluating the Impact of Hepatitis A Vaccination C United States, 1990B2001. *Taraz Samandari*

9:35 Ovulation Stimulation, Assisted Reproductive Techniques, and Craniosynostosis C Atlanta, California, and Iowa, 1993B1997. *Jennita Reefhuis*

9:55 Patient Risk Factors for Delay in Tuberculosis Treatment C Vietnam, 1999. *Puneet Dewan*

10:15 BREAK

10:45a Session B: September 11, 2001. Moderator: Marcelle Layton

10:50 Rapid Assessment of Injuries Related to the Attack on the World Trade Center C New York City, September, 2001. *Daniel S. Budnitz*

11:10 World Trade Center Rescue Worker Injury and Illness Surveillance System C New York, 2001. *Sandra I. Berrios-Torres*

11:30 Health Effects, Respirator Use and Biomonitoring Results Among New York City Firefighters Responding to the World Trade Center (WTC) Disaster C September, 2001. *Debra M. Feldman*

11:50 Physical and Mental Health Status of World Trade Center Neighborhood Residents After the Attack on September 11, 2001 C New York City, 2001. *Nicole M. Smith*

12:10p LUNCH

— Monday–Tuesday Poster Session, Decatur Ballroom A— Meet the Authors

Authors will be present to discuss their studies on Monday, 12:30–1:30 p.m.
(Posters will be on display from Monday, 8:00 a.m., until Tuesday, 5:00 p.m.)

Antimicrobial Resistance

P1. Multidrug-Resistant Tuberculosis Among Latvian Children, 1998B2001. *Lisa J. Nelson*

P2. Outcomes of Standardized Treatment for Multidrug-Resistant Tuberculosis C South Africa, 1999B2000. *Lorna E. Thorpe*

P3. Antimicrobial Resistance in Non-Typhoidal Salmonella Is Associated with Increased Hospitalization C United States, 1996B2000. *Jay K. Varma*

P4. The Role of Antimicrobial Resistance in Pneumococcal Treatment Failures. *Michael T. Martin*

P5. Household Factors Influencing Adult Carriage of *Streptococcus pneumoniae* (SP) among Alaska Natives, 2000 and 2001. *Henry C. Baggett*

Neonatal, Infant, and Child Health

P6. Characteristics of Stillbirths and Early Neonatal Deaths C United States, 1995B1998. *Wanda D. Barfield*

P7. Congenital Diaphragmatic Hernia: Risk Factors and Outcome C Metropolitan Atlanta, 1968B 1999. *Mary M. Dott*

P8. Anemia and Elevated Blood Lead Levels C Chuuk State, Federated States of Micronesia, 2001. *Dennis Y. Kim*

P9. Rate of Decline of Blood Lead Levels in a Lead-Poisoned Population of Children Aged 0B6 Years C Wisconsin, 1995. *Kristina M. Zierold*

Parasitic, Vector-borne, and Viral Diseases

P10. Possible Re-Emergence of Lymphatic Filariasis C American Samoa, 2001. *Thomas R. Handzel*

P11. Risk Factors for Infection During a Dengue-1 Outbreak C Maui, Hawaii, 2001. *John M. Hayes*

P12. Outbreak of Powassan Encephalitis C Maine and Vermont, 1999B2001. *Steven R. Hinten*

P13. Epidemiology of Raccoon and Skunk Rabies in the Eastern United States, 1981B2000. *Marta A. Guerra*

P14. Fight the Bite: Risk Factors for West Nile Viral Meningoencephalitis C Staten Island, New York, 2000. *Michael S. Phillips*

P15. Aseptic Meningitis Outbreak in an Area of Intense West Nile Virus Epizootic Activity C Baltimore, 2001. *Kathleen G. Julian*

P16. Outbreak of Echovirus 18 Meningitis at a Summer Camp C Alaska, 2001. *Joseph B. McLaughlin*

1:30p Session C: Reproductive Health: Problems of Childbearing. Moderator: Gilberto F. Chavez

1:35 Cardiomyopathy: Emerging Cause of Pregnancy-Related Death C United States, 1979B1997? *Sara J. Whitehead*

1:55 Rubella Antibody Seroprevalence Among Women of Childbearing Age C Kyrgyzstan, 2001: Implications for a Rubella Vaccination Strategy To Prevent Congenital Rubella Syndrome. *Naile Malakmadze*

2:15 Association Between High Pregnancy Weight Gain, Macrosomia, and Trends in Cesarean Section C United States, 1989B1999. *Julia C. Rhodes*

2:35 Burden of Malaria During Pregnancy in Areas of Unstable Transmission C Ethiopia, 2000B2001. *Robert D. Newman*

2:55 BREAK

3:15p Session D: HIV and STD Investigations. Moderator: Ida M. Onorato

3:20 Emergence of Ciprofloxacin-Resistant *Neisseria gonorrhoeae*: Prevalence and Risk Factors for Infection C United States, 1998B2000. *Lori M. Newman*

3:40 HIV/AIDS Knowledge and Sex Behavior Among Chuukese Living in the Outer Islands C Micronesia, 2001. *Toya V. Russell*

4:00 Effects of Counselor Characteristics on Incident Sexually Transmitted Disease After an HIV Counseling Intervention C Project Respect, 1993B1996. *Lisa N. Pealer*

4:20 Once is Not Enough: Re-Screening Sexually Transmitted Disease (STD) Clinic Patients in Six Months To Detect New, Unrecognized STDs C United States, 1993B1996. *Omotayo O. Bolu*

4:40 Trends in Injection-DrugBRelated HIV Diagnoses C United States, 1994B2000. *Tanya T. Sharpe*

6:00 p Cash-Bar Social, The Atrium, Holiday Inn

— Tuesday, April 23, 2002 —

8:30a Session E: Vaccine-Preventable Diseases. Moderator: Larry Pickering
Presentation of the Iain C. Hardy Memorial Award

8:35 Bell=s Palsy After a New Intranasal Influenza Vaccine C Switzerland, 2000B2001. *Weigong Zhou*
8:55 Is Vaccination Coverage Related to the Number of Immunization Providers? Findings from the National Immunization Survey C United States, 2000. *Temeika L. Fairley*
9:15 Pertussis Hospitalizations in the United States, 1992B1996: Capture-Recapture Evaluation of the Completeness of National Reporting. *Chima John Ohuabunwo*
9:35 Outbreak of Rubella C Bishkek City and Chui Oblast, Kyrgyzstan, 2001. *Gustavo H. Dayan*
9:55 BREAK

10:30a Session F: Infant and Child Health: Intervention and Prevention. Moderator: José F. Cordero

10:35 Early-Onset Sepsis Among Neonatal Intensive Care Unit Patients C Cairo, Egypt, 2001. *Kelly L. Moore*
10:55 New Look at Late-Onset Group B Streptococcal Disease in the Era of Intrapartum Antibiotic Prophylaxis. *Ilin Chuang*
11:15 Nutritional Status of Children After Severe Winter Weather C Mongolia, 2001. *Janet H. Bates*
11:35 Critical Gaps in Child Occupant Safety, Surveillance, and Legislation C Georgia, 2001. *Catherine E. Staunton*
11:55 LUNCH

12:15p Monday–Tuesday Poster Session, Decatur Ballroom A
(See the Monday schedule for list of presentations)

— Special Session, Swanton Conference Theater —

12:15p Excellence in Public Health Practice: The Product of Excellence in Training in Applied Epidemiology. Moderator: To be announced

1:25p Session G: Mackel Award Finalists. Moderator: M. Patricia Quinlisk
Presentation of the James H. Steele Veterinary Public Health Award

1:35 Dances with Cows? Large Outbreak of *Escherischia coli* O157 Infections at a Multi-Use Community Facility C Lorain County, Ohio, September 2001. *Jay K. Varma*
1:55 Serologic Testing of Symptomatic Patients Exposed to Anthrax C Washington, DC, October, 2001. *Julia C. Rhodes*
2:15 Cows, Bugs, and Drugs: Investigation of Sporadic Illnesses Caused by Multidrug-Resistant *Salmonella Newport* C Massachusetts and Vermont, 1998B2001. *Amita Gupta*
2:35 Surgery, Air, Water Damage, and Curvularia: Is Being Curvaceous Worth the Price? C Alabama, 2001. *Marion A. Kainer*
2:55 BREAK

3:15p Session H: Public Health Surveillance. Moderator: Daniel M. Sosin

3:20 Surveillance for Anthrax Cases Associated with Intentional *Bacillus anthracis* Release C New Jersey, Delaware, and Pennsylvania, OctoberBDecember 2001. *Christina G. Tan*
3:40 Antimicrobial Susceptibility and Serotype Patterns of Invasive Group B Streptococcus Isolates C Georgia, Minnesota, New York, and Oregon, 1996B2000. *Mei L. Castor*
4:00 Spuriously High Injury Death Rates Among Hispanics C North Carolina, 1998. *Rebecca L.Winston*
4:20 Capture-Recapture Assessment of Dog Bite Incidence Among Children C Chatham County, Georgia, 2000. *Regina L. Tan*
4:40 New National Surveillance System for Notifiable Diseases: Evaluation After the First Year of Implementation C Germany, 2001. *Gérard Krause*

6:00p Prediction Run, Lullwater Park

— Special Session: International Night, Decatur Ballroom —

Sponsored by the Training in Epidemiology and Public Health Interventions Network (TEPHINET)

7:00p International Health Poster Session

P1. Epidemic of Toxoplasmosis Associated with Ingestion of Contaminated Municipal Water – Brazil. *Lenildo de Moura*

P2. Detection and Response to the Presence of Circulating Vaccine-Derived Poliovirus – Philippines, 2001. *Agnes B. Benegas*

P3. Nosocominal *Serratia Marcescens* Sepsis Associated With Contaminated Saline – Tokyo, Japan, 2002. *Takeshi Tanaka*

7:30 Session I: International Health: Information and Action. Moderator: Philip Brachman

7:40 A New Tool For Monitoring National Seroprevalence of Human Immunodeficiency Virus (HIV) – Mali, West Africa, 2001. *Rachel N. Bronzan*

8:00 Risk Factors For Severe Injury and Death During the 2001 Moquegua, Perú Earthquake. *Víctor Alva-Dávalos*

8:20 Typhoid Fever Outbreak Investigation in Tan Tien village, Ha Tay Province, Vietnam, May – June 2001. *Nguyen Quoc Trung*

8:40 Health Workers' Knowledge and Practices on Malaria Case Management in Under Five Children – Rukungiri District, Uganda, September 2000. *Mugenyi Kizito*

9:00 Congenital Rubella Syndrome Following a Community-Wide Rubella Outbreak – Rio Branco, Acre, Brazil, 2000 – 2001, *Tatiana M. Lanzieri*

9:20 Pesticide Poisoning in a Rural Village in Quezon Province, Philippines, December 2000 – January 2001. *Aura C. Corpuz*

9:40 Presentation of William H. Foege Award. Closing Remarks.

— Wednesday, April 24, 2002 —

8:30a Session J: Something is in the Air: Respiratory Health Problems. Moderator: Michael A. McGeehin

8:35 Suspected Illness Associated with Flooding and Mold Growth Among the Turtle Mountain Band of Chippewa C Belcourt, North Dakota, 2001. *Allison L. Stock*

8:55 Gender Differences in Adult Asthma Prevalence C United States, 2000. *R. Charon Gwynn*

9:15 Economic Impacts of Clean Indoor Air Ordinances on Restaurant Economies in Four Texas Cities, 1987 and 1999. *James A. Hayslett*

9:35 Outbreak of Travel-Related Legionnaires Disease C Las Vegas, 2001. *Rachel J. Gorwitz*

9:55 BREAK

10:30a Session K: Close Quarters: Institutional and Community Outbreaks. Moderator: Jeffery P. Davis

10:35 Cluster of Deaths from Group A Streptococcus in a Nursing Home C Georgia, 2001. *Carolyn M. Greene*

10:55 Risk Factors for Flouroquinolone-Resistant *Salmonella senftenberg* in a Long-Term Care Facility Outbreak C Florida, 2000B2001. *Marc S. Traeger*

11:15 Multifacility Outbreaks of Salmonellosis Among South Carolina Department of Corrections Inmates, FebruaryBMarch 2001. *Adrian N. Stoica*

11:35 Control of an Outbreak of Methicillin-Resistant *Staphylococcus aureus* Skin Infections in a Correctional Facility Setting: Systemwide Prevention Approach C Georgia, 2001. *Susan H. Wootton*

11:55 Community-Associated Methicillin-Resistant *Staphylococcus aureus* Nasal Carriage Among an American Indian Population C Washington, 2000B2001. *Richard F. Leman*

12:15p LUNCH

— Wednesday-Thursday Poster Session, Decatur Ballroom A —
Meet the Authors

Authors will be present to discuss their studies on Wednesday, 12:30–1:30 p.m.
(Posters will be on display from Wednesday, 8:00 a.m., until Thursday, 5:00 p.m.)

Anthrax and Other Bacterial Diseases: Risks for Workers, Risks for the Community

P1. First Outbreak of Bioterrorism-Related Anthrax C Florida, New York, Metropolitan District of Columbia Area, New Jersey, Connecticut, 2001. *Pratima L. Raghunathan*

P2. Adverse Events Associated with Post-Exposure Antimicrobial Prophylaxis for Prevention of Anthrax C Florida, New Jersey, New York City, Maryland, Virginia, and Washington, DC, 2001. *Colin W. Shepard*

P3. Risk for Meningococcal Disease Among Laboratorians, 1985B2000. *James J. Sejvar*

P4. Vesiculating Reactions to Tuberculin Skin Testing Among Health-Care Personnel in Taiwan and Thailand. *Marion A. Kainer*

P5. Are Martha's Vineyard Landscapers at Increased Risk for Tularemia? C Massachusetts, 2001. *Katherine A. Feldman*

Infectious Diseases: Water-Born or Water-Borne

P6. Plague o- Frogs: Outbreak of *Salmonella Javiana* Infections C Mississippi, 2001. *Padmini Srikantiah*

P7. Sharing Shigella: Risk Factors and Costs of a Multi-Community Outbreak of Shigellosis C Southwest Ohio, 2001. *Andi L. Shane*

P8. Outbreak of ANorwalk-Like Virus@ Linked to a Contaminated Water System C Wyoming, 2001. *Joslyn Cassady*

P9. Recreational Waterpark Outbreak of *Cryptosporidium parvum* C Illinois, August 2001. *Louise M.A. Causer*

P10. Health Outcome Evaluation of a Novel Technology to Purify Water: Household-Based Flocculation and Chlorination of Drinking Water C Guatemala, 2001. *Megan E. Reller*

Health Problems Among Adults

P11. Syphilis Among Men Who Have Sex with Men C Miami-Dade County, Florida, 2001. *Rachel N. Bronzan*

P12. How Do Common Methods of Diagnosing Bacterial Vaginosis Correlate with Microbiological Profiles? *Beth C. Tohill*

P13. Invasive Cervical Cancer Among Hispanic and Non-Hispanic Women C United States, 1992B1998. *Sidibe Kassim*

P14. Evaluation of Melanoma Reporting C Oregon, 1996B1999. *Barna D. Tugwell*

P15. Food Insecurity as a Risk Factor for Obesity C Washington, 1995B1999. *Jennifer C. Sabel*

P16. Attempting to Lose Weight: Weight Loss Practices Among U.S. Adults. *Judy Kruger*

1:30p Session L: Bioterrorism-Associated Anthrax: Reports from the Field. Moderators: Bradley A. Perkins and Steven Wiersma

1:35 Anthrax Outbreak Averted: Public Health Response to a Contaminated Envelope on Capitol Hill C Washington, D.C., 2001. *Susan L. Lukacs*

1:55 Inhalational Anthrax in a Postal Facility: Is It Possible To Assess Risk of Exposure? C Washington, DC, October 2001. *Bruce C. Tierney*

2:15 Eleven Cases of Cutaneous Anthrax Infection Associated with Contaminated Mail C New York and New Jersey, October 2001. *Michael S. Phillips*

2:35 Letters from Trenton: Anthrax Investigation at the Source C New Jersey, 2001. *Jennita Reefhuis*

2:55 Inhalational Anthrax C New York City, OctoberBNovember 2001. *Timothy H. Holtz*

3:15 Aftermath of Daschle-Leahy: Epidemiologic Investigation of a Case of Inhalational Anthrax C Connecticut, 2001. *Kevin S. Griffith*

3:35p BREAK

4:00p Announcement of Langmuir Prize winner
Session M: ALEXANDER D. LANGMUIR MEMORIAL LECTURE and RECEPTION – Sponsored by Sigma XI, the EIS Alumni Association, and the Epidemiology Program Office
Speaker: Marcelle Layton, M.D.
Topic: Public Health Response to Terrorism: Rising to the Challenge

5:30p EIS Alumni Association Meeting, Old Decatur Courthouse, 2nd Floor

— Thursday, April 25, 2002 —

8:30a Session N: *Primum No Nocere*: Health-Care-Associated Illnesses. Moderator: Julie L. Gerberding
8:35 *Enterobacter cloacae* Bloodstream Infections Among a Pediatric Population Associated with Contaminated Ranitidine Infusate C Missouri, 2001. *Dejana Selenic*
8:55 Adverse Events and Deaths Associated with Laboratory Errors at a Hospital C Philadelphia, 2001. *Soju Chang*
9:15 Hospital Outbreak of *Candida parapsilosis* Bloodstream Infections C Mississippi, 2001. *Thomas A. Clark*
9:35 Outbreak of Invasive Aspergillosis Among Renal Transplant Recipients C Los Angeles, California, 2001. *Anil A. Panackal*
9:55 *Pseudomonas aeruginosa* Associated with a Design Change in Specific Models of Bronchoscopes C Tennessee, 2001. *David L. Kirschke*
10:15 Outbreak of *Mycobacterium chelonae* Keratitis Associated with LASIK Eye Surgery C California 2001. *Kevin L. Winthrop*
10:35 BREAK

11:00a Session O : Violence Prevention. Moderator: Sue Binder
11:05 Copycat Events on the Anniversary of the Incident at Columbine High School. *Krista R. Biernath*
11:25 Suicide Attempts: Individual and Contextual Predictors C Maine, November 1999BOctober 2000. *Kathleen D. Askland*
11:45 Suicidal Ideation Among Adult Medicaid Clients C Oregon, 1999. *Barna D. Tugwell*
12:05p LUNCH

12:30p Wednesday-Thursday Poster Session, Decatur Ballroom A
(See the Wednesday schedule for the list of presentations)

1:25p Session P: International Health. Moderator: Richard J. O'Brien
Presentation of the Paul C. Schnitker Memorial Award
1:35 Seasonality of TB in India: Is It Real and Why Is It Important? *Lorna E. Thorpe*
1:55 Tuberculosis Among Tibetan Refugees C India, 1994B1996. *Lisa J. Nelson*
2:15 Determinants of High Frequency of Therapeutic Injections C Chisinau, Republic of Moldova, 1998. *Sirenda Vong*
2:35 Determinants of Clinical Performance Among Community Health Workers C Siaya District, Kenya, FebruaryBMarch 2001. *Jane M. Kelly*
2:55 Geographic Determinants of *Schistosoma mansoni* Infections as a Means of Prioritizing Communities for Mass Treatment of Children C Western Kenya, 2001. *Thomas R. Handzel*
3:15 BREAK

3:30p Session Q: Child and Adolescent Health. Moderator: Andrew R. Pelletier

3:35 Differences Between Causes of Fatal versus Non-Fatal Injuries Among American Children, Using the CDC Web-Based Injury Statistics Query and Reporting System (WISQARS). *Michael F. Ballesteros*

3:55 Prevalence of Mental Retardation Among Children Aged 6B10 Years C Atlanta, Georgia, 1991B1994. *Rachel N. Avchen*

4:15 Oral Health Survey of Third Grade Students C New Hampshire, 2001. *Alcia A. Williams*

4:35 Contraception Use and Barriers to Contraception Use Among Teen Mothers with Unintended Pregnancy C California, 1999 and 2000. *Sharon Durousseau*

8:30p EIS Satirical Revue

— Friday, April 26, 2002 —

8:30a Session R: Worker Safety: Lessons from Anthrax Investigations. Moderator: Scott D. Deitchman

8:35 Environmental Testing for *Bacillus anthracis* Spores in a Postal Facility: the Connecticut Experience. *Eyasu H. Teshale*

8:55 Risk of Re-Aerosolization of *Bacillus anthracis* Spores in a Mail Facility Associated with a Contaminated Sorting Machine. *Peter M. Dull*

9:15 Promoting Postal Workers= Adherence to Antibiotic Prophylaxis To Prevent Inhalational Anthrax C Washington, D.C., 2001. *Mariaelena D. Jefferds*

9:35 Anthrax Post-Exposure Prophylaxis Adherence Among Postal Workers C Connecticut, 2001. *Jennifer L. Williams*

9:55 BREAK

10:15a Mackel and Poster Awards

10:30a Session S: Latebreaking Reports. Moderator: Mary R. Reichler

11:55a LUNCH

1:15p Session T: Outbreaks of Foodborne Disease... or Not? Moderator: Paul A. Blake

1:20 Outbreak of *Escherichia coli* O157:H7 Infections Associated with a Pancake Breakfast Served in a Stock Pavilion with Contaminated Livestock Bedding C Wisconsin, 2001. *Donita R. Croft*

1:40 Outbreak of *Escherichia coli* O157:H7 Infection Associated with Pears C Washington State, 2001. *Gaston Djomand*

2:00 Lead Poisoning Associated with Imported Mexican Candies C California, 2001. *Lisa M. Brown*

2:20 *Salmonella E*nteritidis on the Rise? Investigation of a Statewide Egg-Associated Outbreak C North Carolina, 2001. *Tom M. Chiller*

2:40 Dangers of Discounted Food: Outbreak of Botulism from Food Sold at a Salvage Food Store C Texas, August 2001. *Pavani Kalluri*

3:00p Closing Remarks and Adjournment – Stephen B. Thacker, Director, Epidemiology Program Office

Index to Presentations — 2002 EIS Conference

Abbreviations

Epidemiology Program Office ..... EPO
National Center for Birth Defects and Developmental Disabilities..... NCBDDD
National Center for Chronic Disease Prevention and Health Promotion. ..... NCCDPHP
National Center for Environmental Health ....NCEH
National Center for Health Statistics ..... NCHS
National Center for HIV, STD, and TB Prevention ..... NCHSTP
National Center for Infectious Diseases ..... NCID
National Center for Injury Prevention and Control ..... NCIPC
National Immunization Program ..... NIP
National Institute for Occupational Safety and Health ..... NIOSH
Preventive Medicine Residency Program ..... PMR

Presenting EIS Officers by Center, Institute, Office

EPO

Kathleen Askland
Joslyn Cassady
Mei Lin Castor
Donita Croft
Gaston Djomand
Sharon Durousseau
Kevin Griffith
James Hayslett
David Kirschke
Richard Leman
Joseph McLaughlin
Michael Phillips
Jennifer Sabel
Adrian Stoica
Christina Tan
Regina Tan
Marc Traeger
Barna Tugwell
Alcia Williams
Kevin Winthrop
Susan Wootton
Kristina Zierold

NCBDDD

Rachel Avchen
Mary Dott
Jennita Reefhuis
Jennifer Williams

NCCDPHP

Wanda Barfield
Janet Bates
Mariaelena Jefferds
Sidibe Kassim
Judy Kruger
Beth Tohill
Sara Whitehead

NCEH

Lisa Brown
R. Charon Gwynn
Dennis Kim
Jill Morris
Nicole Smith
Allison Stock

NCHS

Susan Lukacs
Julia Rhodes

NCHSTP

Omotayo Bolu
Rachel Bronzan
Puneet Dewan
Lisa Nelson
Lori Newman
Lisa Pealer
Toya Russell
Tanya Sharpe
Eyasu Habtu Teshale
Lorna Thorpe

NCID

Henry Baggett
Louise Causer
Soju Chang
Tom Chiller
Ilin Chuang
Thomas Clark
Peter Dull
Katherine Feldman
Rachel Gorwitz
Carolyn Greene
Marta Guerra
Amita Gupta
Thomas Handzel
John Hayes
Steven Hinten
Kathleen Julian
Marion Kainer
Pavani Kalluri
Jane Kelly
Michael Martin
Kelly Moore
Robert Newman
Anil Panackal
Pratima Raghunathan
Megan Reller
Taraz Samandari
James Sejvar
Dejana Selenic
Andrea Shane
Colin Shepard
Padmini Srikantiah
Jay Varma
Sirenda Vong

NCIPC

Michael Ballesteros
Sandra Berrios-Torres
Krista Biernath
Dan Budnitz
Catherine Staunton
Rebecca Winston

NIOSH

Debra Feldman

NIP

Gustavo Dayan
Temeika Fairley
Naile Malakmadze
Chima John Ohuabunwo
Bruce Tierney
Weigong Zhou

PMR

Timothy Holtz

Field Epidemiology Training Program

Victor Alva-Dávalos
Abnes B. Benegas
Aura Corpuz
Lenildo de Moura
Mugenyi Kizito
Tatiana Lanzieri
Takeshi Tanaka
Nguyen Quoc Trung

ABSTRACTS

Monday Morning — April 22, 2002

8:30 EIS in Action. Moderator: David W. Fleming

8:35 ***Marc S. Traeger and members of the Florida Anthrax Investigation Team****
Investigation of the First Bioterrorism-Related Anthrax Case in the United States — Palm Beach County, Florida, 2001.

Background: In October 2001, *Bacillus anthracis* was isolated from cerebrospinal fluid of a Florida resident. Initial investigation indicated that exposure occurred at the workplace through contaminated mail, signifying the first United States bioterrorism-related anthrax case. We investigated to determine the extent of the event and develop control strategies.
Methods: We defined cases as compatible illnesses in persons with laboratory-confirmed *B. anthracis*. Anthrax surveillance was implemented in regional intensive care units, laboratories, and medical examiners' offices and among workplace-exposed persons and postal workers. To assess exposure, we obtained nasal cultures from workplace-exposed persons and postal workers at greatest exposure risk. Environmental cultures were obtained from the workplace and upstream postal facilities. Workplace-exposed persons were offered serologic testing for antibodies against *B. anthracis* protective antigen.
Results: One additional inhalational anthrax case was identified from the workplace, confirmed by immunohistochemical, polymerase chain reaction, and serologic testing. The index case-patient handled a suspicious letter; the other case-patient was a company mail-handler and had a positive nasal culture. *B. anthracis* was isolated from an asymptomatic workplace mail-handler (one of 1051 nasal cultures), the workplace mail van and mailroom, and six postal facilities serving the workplace. Among >400 asymptomatic workplace-exposed persons, none of the serologic tests indicated reaction to *B. anthracis*. We identified 1139 persons at risk and provided antimicrobial prophylaxis.
Conclusions: Two inhalational anthrax cases (including the index case) and widespread environmental contamination resulted from contaminated mail. Environmental cultures were useful to detect exposed areas. Nasal cultures helped implicate a mail source but did not help categorize persons' risk status. Serologic tests did not provide additional exposure information. Physicians should remain vigilant for anthrax because of the continued threat of bioterrorism.

Key Words: Anthrax, *Bacillus anthracis*, bioterrorism, nasal cultures, environmental cultures

*Florida Anthrax Investigation Team:
Florida Department of Health: Steven Wiersma, Jean Malecki, Segaran Pillai, Savita Kumar, Peter M.-T. Shih, Raul Cortes, Rosayda Cortes, Samuel Crane, Marc Diamante, Jody Dielmann, Romualde Erase, Dwight Frazier, Dolly Katz, Phil Lee, Elsa Merlo, Zuber Mulla, Roger Sanderson, Kathryn Teates, Don Ward, and Robert Whisenhunt.

8:55 ***Jill M. Morris, A. Brown, M. Gwinn, M. Khoury***
Association Between Family History of Colorectal Cancer and Preventive Health Behaviors in Women — United States, 1997.

Background: Colorectal cancer (CRC) is the third leading cause of cancer-related mortality in the U.S., claiming over 56,000 lives annually. Although family history (FHx) is the second strongest risk factor for CRC, it is not known whether having a FHx of CRC motivates people to change lifestyle and screening behaviors to reduce their risk.

Methods: We conducted a cross-sectional analysis of data from 64,473 cancer-free women interviewed in 1997 for the American Cancer Society's Cancer Prevention Study II. FHx of CRC was categorized as strong (2 or more first-degree relatives with CRC, or one aged <50) or moderate (only 1 first-degree relative with CRC, not aged <50). We used multinomial logistic regression to estimate adjusted odds ratios (OR) for associations between FHx and screening/lifestyle factors. Regression models included age, education, type of health care coverage, and FHx of other cancers.
Results: The median age of participants was 67; 98% were white. Overall, 13.5% of respondents reported a FHx of CRC: 2.1% had a strong and 11.3% had a moderate FHx. Compared with women who had no FHx of CRC, those with a strong FHx were more likely to have undergone recent endoscopy (OR=2.3, 95% Confidence Interval [CI]=2.1-2.6), as were those with a moderate FHx (OR=1.8, CI=1.7-1.9). Women in both groups were slightly more likely to be nonsmokers, regular aspirin users, and to have had a rectal exam.
Conclusions: Awareness of a FHx of CRC may motivate people to seek endoscopy or engage in other preventive behaviors. Promoting awareness of FHx and incorporating FHx into prevention messages may be promising tools for increasing CRC screening and other preventive behaviors.

Key words: colorectal cancer, family history, endoscopy, risk factor, behavior

9:15 ***Taraz Samandari, A. Wasley, B. Bell***
Evaluating the Impact of Hepatitis A Vaccination — United States, 1990 – 2001.

Background: Hepatitis A is one of the most frequently reported vaccine-preventable diseases in the United States. In 1999, the Advisory Committee on Immunization Practices recommended routine hepatitis A vaccination for children living in 11 high incidence states (HIS) (average rate ≥20/100,000 during 1987-1997), and suggested it for children in 6 intermediate incidence states (IIS) (rate 10-19/100,000). We examined incidence trends to assess the impact of this policy.
Methods: Hepatitis A rates were determined using data from the National Notifiable Disease Surveillance System and population estimates from the U.S. Census Bureau. Data from 2001 are provisional.
Results: During 1990-2001, overall hepatitis A rates declined 70%, from 12.5/100,000 to a historic low of 3.8/100,000. Rates declined most dramatically among children 2-18 years (82% vs. 61% among persons >18). Despite declines among all racial/ethnic groups, the decline among Hispanic children (78%) lagged behind non-Hispanic children (92%). Compared to average 1987-1997 rates, by 2001, the rate in HIS declined by 83% to 4.5/100,000, in IIS by 77% to 3.8/100,000, but by only 39% to 3.4/100,000 elsewhere. HIS cases accounted for 48% of the national total during 1987-97, but for only 26% of 2001 cases. During 1998-2000, public sector pediatric vaccine doses purchased by the 17 states increased from 532,885 to 2,723,685, and in 2000, accounted for 95% of all such hepatitis A vaccine purchased.
Conclusions: The precipitous decrease in hepatitis A rates in states where routine vaccination is recommended and where vaccine purchase was greatest, suggests that this strategy is reducing disease rates. Continued monitoring is needed to verify that low rates are sustained and attributable to vaccination. Reasons for the differential decline in rates between Hispanic and non-Hispanic children should be identified.

Key words: hepatitis A vaccines, vaccination, health policy, United States, epidemiology

9:35 ***Jennita Reefhuis, G. Shaw, P. Romitti, M. Honein***
Ovulation Stimulation, Assisted Reproductive Techniques, and Craniosynostosis — Atlanta, California and Iowa, 1993 – 1997.

Background: The use of fertility treatments increased from 12% in 1988 to 15% in 1995 and is still increasing. Craniosynostosis is a malformation caused by premature closure of the cranial sutures that requires surgery. This birth defect is associated with higher maternal age, which is associated with fertility treatments. Determining whether infants born to women who receive certain fertility treatments are at increased risk for this malformation is of public health importance.

Methods: Data were used from the Birth Defect Risk Factor Surveillance study (BDRFS), a study that included infants (live borns and fetal deaths) delivered during 1993–1997 in three locations (Atlanta, California, and Iowa). Cases, defined as infants with non-familial craniosynostosis, were selected from existing birth defect registries. Non-malformed control infants were ascertained from a random sample of live births, and mothers of cases and controls were interviewed by phone. The exposures of interest for this analysis were ovulation stimulation using clomiphene citrate (CC) and use of any other assisted reproductive techniques (ART).
Results: Mothers of 100 cases and 775 controls were interviewed. CC was used by 20 mothers before or during the pregnancy, and ART was used in 16 pregnancies. Univariate analyses demonstrated an association between CC and craniosynostosis (odds ratio [OR]=4.4; 95% confidence interval [CI]=1.7-11.2) and between ART and craniosynostosis (OR=4.8; 95%CI=1.7-13.6). All women using either CC or ART were white, and all but one did not smoke. Multiple logistic regression analysis controlling for infant sex, maternal age, and education did not change the associations.
Conclusions: The observed association between use of CC and ART and craniosynostosis may provide clues to the etiology of the malformation and is important for counseling couples seeking fertility treatment.

Key words: abnormalities, craniosynostoses, reproductive techniques, assisted, clomiphene, registries, epidemiology

9:55 ***Puneet K. Dewan, Dang Thi Thuy Nhien, B. Duong, H. Quy, V Co, N. Binkin, K. Laserson***
Patient Risk Factors for Delay in Tuberculosis Treatment — Vietnam, 1999.

Background: Tuberculosis (TB) is the third-leading cause of death in Vietnam. Delays in diagnosis and treatment substantially increase the risk of mortality, though little is known about the magnitude and risk factors for such delays.
Methods: We conducted a cross-sectional study of all new TB patients reported during May-June 1999 in Ho Chi Minh, Vietnam. Questionnaires were administered and TB registries were reviewed to obtain information on sociodemographic characteristics, beliefs, symptoms, and initial medical point-of-care. Patient-delay was defined as >60 days from TB symptom onset to first medical encounter, and provider-delay as >14 days from first encounter to initiation of therapy.
Results: Of the 614 eligible patients, 565 were enrolled; 27% met the definition of patient delay and 57% met the definition of provider-delay. No significant associations were found between patient-delay and beliefs about TB transmission, cure, or potential community ostracism. The most common initial points-of-care were pharmacies (35%), followed by government clinic (32%), private provider (21%), and the government TB hospital (11%). Twenty-four percent of patients seeking care in the government TB hospital had provider delay, versus 60% who sought care elsewhere. Provider-delay was 2.8 times more likely in patients seeking care from private providers (95%CI 1.7,4.6) and 2.7 times more likely for those first seen by pharmacies (95%CI 1.6,4.4) relative to those seen in the government TB hospital. Patient perception of provider distance was not associated with point-of-care choice.
Conclusions: In Vietnam, delay in receiving anti-TB therapy is strongly associated with the initial point-of-care. A study of knowledge, attitudes, and beliefs among pharmacists and private providers has been initiated to identify factors contributing to these delays. Results will be used to target delay-reduction interventions.

Key words: Vietnam, tuberculosis, diagnosis, communicable disease control

10:45 September 11, 2001. Moderator: Marcelle Layton

10:50 ***Daniel S. Budnitz, B. Boodram, D. Pollock, T. Davis, L. Torian, P. Thomas, S. Wilt, M. Bell***
Rapid Assessment of Injuries Related to the Attack on the World Trade Center — New York City, September 2001.

Background: The terrorist attack on the World Trade Center (WTC) on September 11, 2001, killed and injured more people than any previous attack on a civilian target in United States history. The New York City Department of Health and CDC investigators conducted a rapid epidemiologic assessment of a sample of hospitals to characterize the injuries and medical needs of survivors.
Methods: Trained personnel manually reviewed hospital records of patients presenting for emergency care at five Manhattan hospitals between 8 AM, September 11, and 8 AM, September 13, 2001. Basic demographic and clinical data, including time, type, and severity of injuries, were abstracted and analyzed. Injuries attributed by hospital staff to the WTC attack were defined as attack related.
Results: Among 790 survivors treated for WTC related injuries, half presented for emergency care within 6.5 hours of the first crash, 139 (18%) were admitted for further treatment, and 279 (35%) were rescue workers. Injuries to civilians accounted for 279 (82%) of survivors presenting for care during the first 6 hours after the attack. Subsequently, most survivors who presented for treatment were rescue workers (207, 54%). Inhalation injuries (386, 49%) and ocular injuries (204, 26%) were the most common injuries. In this sample, rescue workers were twice as likely as non-rescue workers to sustain ocular injuries (39% vs 19%, $p<0.0001$).
Conclusions: Most WTC attack survivors who presented for emergency care at the sampled hospitals did so soon after the attack and sustained injuries treated on an outpatient basis. Identification of injuries sustained by rescue workers supported ongoing, targeted safety interventions. Lessons learned from this rapid assessment can improve surveillance and response in the aftermath of future disasters.

Key words: injury, terrorism, disaster planning, New York City, accidents, occupational

11:10 ***Sandra I. Berrios-Torres, J. Greenko, M. Phillips, J. Miller, T. Treadwell, R. Ikeda***
World Trade Center Rescue Worker Injury and Illness Surveillance System — New York 2001.

Background: The September 11, 2001 terrorist attacks on the World Trade Center (WTC) prompted an unprecedented rescue and recovery response. Rescue operations were conducted around the clock, involved over 5000 rescue workers per day, and extended into months following the attacks. The New York City Department of Health and CDC implemented prospective surveillance to characterize rescue worker-related injuries and illnesses and implement public health interventions.
Methods: From September 14 to October 11, 2001, trained personnel reviewed medical records at four Manhattan hospital emergency departments, and health care providers completed data collection forms at five temporary Disaster Medical Assistance Team (DMAT) facilities located at the WTC site. A rescue worker was any construction worker, police officer, or firefighter evaluated at any of these facilities. Data collected included demographic characteristics, worker category, injury type, illness and disposition. Data were analyzed and summarized daily.
Results: Of 4721 rescue worker visits recorded, 4487 (95%) were evaluated at DMAT facilities and 234 (5%) in emergency departments. Respiratory complaints were the leading cause of visits (n=590, 13%), followed by eye irritation (n=544, 12%), and lacerations (n=251, 5%). Other visits included requests for: medications and supplies (n=361, 8%), and personal protective equipment (n=350, 7%). Fifty-two (1%) rescue workers were transported to area hospitals, and 12 (<1%) resulted in hospitalization.
Conclusions: DMAT facilities were an important resource for ongoing treatment and triaging of rescue workers, thus including these facilities in the surveillance system was crucial. Timely recognition of respiratory and eye complaints prompted increased efforts to distribute and encourage the proper use of personal protective equipment among rescue workers.

Key words: injury, surveillance, disaster, terrorism, occupational

11:30 ***Debra M. Feldman, P. Edelman, S. Baron, C. Mueller, B. Bernard, B. Lushniak, K. Kelly, D. Prezant***
Health Effects, Respirator Use and Biomonitoring Results Among New York City Firefighters Responding to the World Trade Center (WTC) Disaster — September, 2001.

Background: Thousands of firefighters responding to the WTC collapse were exposed to a myriad of chemical and physical hazards, although limited initial environmental data were collected. This study characterizes firefighter exposures and health effects.
Methods: A sample of 400 firefighters was selected to represent those responding during the collapse (group-1), within 48 hours but after the collapse (group-2), on days 3-7 (group-3) and not responding (group-4). From October 2-6, 2001, firefighters completed a self-administered questionnaire regarding health effects and respirator use, and provided blood and urine samples which were analyzed for metals, cyanide, hydrocarbons, biphenyls, dioxins and volatile organic compounds by CDC/NCEH using NHANES protocols.
Results: Of 363 firefighters (participation rate=80%), 150 were group-1, 141 group-2, 28 group-3 and 44 group-4. Symptom rates for group-1+2, group-3 and group-4 were: skin 44%, 18%, 7%, eye 71%, 46%,7% and respiratory 75%, 46%, 9%, respectively. Prevalence Rate Ratios (PRR), group-1+2 vs group-4 were: skin 6.40 (95%Confidence interval [CI]=2.13-19.23), eye 10.38 (95%CI=3.47-31.03) and respiratory 8.28 (95% CI=3.24-21.12). Group-3 PRRs were statistically intermediate; 95% CI all excluded1.0. Reported respirator use was "rarely/not at all" (vs. "mostly") by 87% of those in group-1+2 present on day-1 compared with 67% in groups 1-3 still present during week-2. Although biological monitoring results were within normal limits, results differed significantly by exposure groups.
Conclusions: This evaluation of firefighters demonstrates a relationship between time of arrival and skin, eye, and respiratory symptoms. Further investigation is needed to direct both long-term follow-up and preventive measures for protecting responders to future disasters.

Key words: World Trade Center, biomonitoring, respirators, metals, terrorism, firefighters

11:50 ***Nicole M. Smith, W. Daley, R. Kramer, S. Cotenoff, R. Hayes, A. Goodman, A. Henderson, D. Flanders, C. Rubin***

Physical and Mental Health Status of World Trade Center Neighborhood Residents After the Attack on September 11, 2001 — New York City, 2001.

Background: The attack on the World Trade Center (WTC) killed approximately 3000 people in the towers and affected an estimated 25,000 people living nearby in lower Manhattan. Many of these residents witnessed the attacks; were exposed to smoke, dust, and debris; and evacuated their homes. To assist the New York City (NYC) Department of Health (DOH) with establishing priorities and directing interventions, we surveyed residents living near the WTC to identify their health-related needs and concerns.
Methods: During October 25 to November 1, teams of CDC and NYC DOH staff administered questionnaires in three neighborhoods comprising 12,300 (49%) of the affected lower Manhattan residential population. In housing units randomly selected from residential address lists, one household member was interviewed. We estimated the proportion of residents with adverse health effects including the potential for post-traumatic stress disorder (PTSD), and limited access to services. Risk ratios (RRs) adjusted for neighborhood were calculated to assess characteristics associated with potential PTSD. PTSD potential was evaluated using a standardized checklist.
Results: We interviewed 414 residents. The most frequently reported symptoms that developed or increased after September 11 were nose or throat irritation (66.4% [95% confidence interval (CI)=61.6-70.9]), eye irritation or infection (51.8% [95%CI=46.9-56.8]), or coughing (48.5[95%CI=43.6-53.5]). Among 39.1% (95%CI=34.3-44.0) of respondents with potential PTSD, the greatest risk factors were having fewer than three friends (RR1.83 (95%CI=1.45-2.3), witnessing the attack (RR1.71 [95%CI=1.23-2.39]), or knowing a victim (RR1.46 (95%CI=1.14-1.87). Of 35.7% (95%CI=31.1-40.6) of respondents who thought counseling would be beneficial, 35.5% (95%CI=27.6-44.0) lacked adequate access.
Conclusions: The WTC collapse affected the physical and mental health of neighboring residents. In response, NYC is targeting outreach, counseling, and education services to reduce these adverse health effects.

Key words: needs assessment, disaster, post-traumatic stress disorder, mental health

Monday–Tuesday Poster Session

12:30 Poster Session No. 1 – Meet the Authors Poster Session

Antimicrobial Resistance

P1. ***Lisa J. Nelson, I. Ozere, V. Lemaine, C. Wells***
Multidrug-Resistant Tuberculosis Among Latvian Children, 1998 – 2001.

Background: Multidrug-resistant tuberculosis (resistance to at least isoniazid and rifampin, MDR-TB) is more difficult and costly to treat than drug-susceptible TB, and threatens TB control efforts. The natural history of MDR-TB in adults has received much attention, but not in children where clinical presentation is known to differ. In Latvia, where levels of MDR-TB are high, we studied the epidemiology and outcomes of pediatric MDR-TB.
Methods: We reviewed all records of pediatric MDR-TB cases (0-14 years) diagnosed between 1/98-11/01 at the Latvian hospital which treats all pediatric TB. A case was defined as a child culture-positive for MDR-TB, or children with abnormal x-rays and close contact to confirmed MDR-TB patients.
Results: Of 31 identified pediatric cases (5% of all pediatric TB), 18 had completed therapy, 3 stopped therapy due to toxicity, and 10 remain on treatment. One-third (35%) were <5 years of age, 61% were males, and only 3(10%) were culture-positive. Most cases (64%) were identified through contact tracing of adults with MDR-TB; 29% were identified through symptoms, of which two-thirds were later found to have MDR-TB contacts. Of contacts, 71% were household, and nearly half (46%) were a parent. Unlike adult presentation, only 51% had symptoms, and on x-ray, most had hilar adenopathy (81%) and calcifications (65%). Only 23% had infiltrates/cavities. Patients were treated with a median of 4.7 drugs. Of the 21 who completed/stopped treatment, 90% had clinical and 76% had radiologic improvement. None died or relapsed.
Conclusions: Contact tracing of children exposed to adults with MDR-TB is crucial to identify pediatric MDR-TB cases that are frequently asymptomatic. Knowledge of pediatric MDR-TB natural history is essential to early case identification and successful management.

Key words: tuberculosis, children, drug-resistance, multidrug-resistance, contact tracing

P2. ***Lorna E. Thorpe, K. Weyer, C. Seebregts, A. Terblanche, L. Jacobs, C. Wells***
Outcomes of Standardized Treatment for Multidrug-Resistant Tuberculosis — South Africa, 1999 – 2000.

Background: In 2000, South Africa's (SA) tuberculosis (TB) incidence was the third highest rate worldwide (495/100,00). Health services are burdened by high case loads, including 2,500 patients with difficult and costly to treat multidrug-resistant TB (MDR - resistant to at least isoniazid and rifampin). SA is one of the first countries to adopt standardized treatment for MDR TB, prescribing the same drugs for all patients, instead of more expensive, individualized therapy used elsewhere.
Methods: A retrospective cohort analysis was performed on all metropolitan patients with MDR TB admitted to a referral hospital between October 1999-September 2000 in Eastern Cape. To evaluate treatment effectiveness, sputum conversion rates (from culture-positive to negative for acid-fast bacilli), default rates (loss-to-follow-up during treatment), failure rates (culture-positive at treatment completion) and mortality were examined in HIV-infected and uninfected patients.
Results: Of 170 MDR TB patients hospitalized, 60% were male, 25% HIV-infected, and median age was 37. At data collection, 5% had completed treatment, 43% were still on therapy, 34% defaulted, 16% died and 3% failed. Among all patients sputum-positive before treatment (n=154), 47% converted. Patients still on treatment (≥3 months) or who completed had 81% conversion. HIV-infected patients had significantly more deaths than HIV-uninfected (odds ratio [OR], 2.5; 95% confidence interval [CI], 1.0 - 6.4), less default (OR, 0.6; 95%CI, 0.4 – 0.9), but similar conversion rates.

Conclusions: Compared to individualized therapy results elsewhere, sputum conversion rates using standardized therapy were low, mainly due to high default rates. However, among patients remaining on therapy, conversion was high and comparable to individualized results, suggesting high potential efficacy. MDR TB management in SA should focus on ensuring that patients remain on treatment.

Key words: South Africa, tuberculosis, multidrug-resistant, treatment outcomes, standardized treatment

P3. ***Jay K. Varma, K. Molbak, S. Rossiter, M. Hawkins, T. Jones, S. Mauvais, T. Rabatsky-Her, S. Stenzel, D. Vugia, M. Park, K. Joyce, K. Stamey, T. Barrett, F. Angulo, FoodNet Working Group***

Antimicrobial Resistance in Non-Typhoidal Salmonella Is Associated with Increased Hospitalization — United States, 1996 – 2000.

Background: Non-Typhoidal *Salmonella* is a leading cause of foodborne illness. The prevalence of multi-drug resistant *Salmonella* increased from 12% in 1980 to 21% in 2000. Few studies, however, have explored the human health consequences of resistant *Salmonella*.
Methods: The Foodborne Diseases Active Surveillance Network (FoodNet) has conducted *Salmonella* surveillance since 1996, ascertaining hospitalization status on all laboratory-confirmed infections. In 17 states, including nine FoodNet sites, every 10th non-Typhoidal isolate is forwarded to the National Antimicrobial Resistance Monitoring System (NARMS), which tests susceptibility to 14 antimicrobial agents. We analyzed data from FoodNet and NARMS to determine whether resistance to commonly used agents (cephalosporins, quinolones, or aminoglycosides) was associated with hospitalization.
Results: From 1996-2000, NARMS tested 1,020 non-Typhoidal *Salmonella* isolates for which a FoodNet case report was also completed. Patients with isolates resistant to commonly used agents were hospitalized more frequently than patients with susceptible isolates (35% vs. 23%) (odds ratio [OR]=1.8, 95% confidence interval [CI]=1.1-3.2). The odds of hospitalization increased (OR=2.0, 95% CI=1.1-3.7) after controlling for age, race, surveillance site, serotype, and bloodstream infection in multivariate analysis. From 1996-2000, NARMS received 5,566 serotyped blood or stool isolates from all 17 states. Among these isolates, resistance to commonly used agents was not associated with bloodstream infection (OR=1.5, CI=.88-2.4).
Conclusions: Infection with non-Typhoidal *Salmonella* resistant to cephalosporins, aminoglycosides, or quinolones was associated with an increased risk of hospitalization. Resistant *Salmonella* were no more invasive than susceptible bacteria. Research is needed to determine specific factors that contribute to excess hospitalization among patients with resistant infections, such as failure of empiric antimicrobial therapy or the presence of co-morbid conditions. Antimicrobial agents should be used judiciously to help mitigate increasing resistance.

Key words: *Salmonella*, drug resistance, microbial, hospitalization, risk factor

P4. ***Michael T. Martin, C. Wright, M. Farley, J. Hadler, L. Harrison, C. Lexau, A. Reingold, P. Cieslak, K. Gershman, N. Bennett, A. Craig, J. Jorgensen, C. Whitney, CDC Emerging Infections Program, Atlanta, Georgia***

The Role of Antimicrobial Resistance in Pneumococcal Treatment Failures.

Background: *Streptococcus pneumoniae* causes 63,000 cases of invasive disease annually in the United States. Antibiotic-resistant strains are common and treatment failures have been reported with meningitis. It is, however, unclear if resistance is clinically relevant for other invasive syndromes. We sought to determine whether antibiotic resistance contributes to serious treatment failures by examining illnesses in which antibiotics failed to clear pneumococcus from patients' blood.
Methods: Persistent invasive pneumococcal infection (PIPI) was defined as isolation of *S. pneumoniae* from normally sterile sites collected 2-7 days apart. During 1998-2001, we collected PIPI reports from Active Bacterial Core Surveillance (ABCs), a population-based system monitoring invasive bacterial

disease among 20,000,000 persons in the United States. Investigators recorded data on factors potentially contributing to treatment failure, including antimicrobial resistance, immune suppression, and presence of deep-seated infections.
Results: Investigators identified 34 episodes of PIPI. Of these, 21 patients had reasons other than resistance for treatment failure; 12 did not receive antibiotics before the second culture and 9 had deep-seated infections (pleural effusions, meningitis, abscesses, joint effusion). Among the remaining 13 patients, all of whom had primary bacteremia or bacteremia with otitis media or pneumonia, eight patients (62%) received antibiotic therapy to which the isolate had resistance (intermediate or resistant). In contrast, only 38% of ABCs isolates had resistance (intermediate or resistant) to any antibiotic during this time.
Conclusions: These examples indicate that resistance may play a role in treatment failure in a variety of serious pneumococcal syndromes. Therefore, new tests to rapidly identify resistant pneumococci and widespread adoption of public health interventions to prevent resistant infections, such as campaigns promoting appropriate antibiotic and vaccine use, are needed.

Key words: *Streptococcus pneumoniae*, antibiotic-resistance, pneumococcal, macrolide

P5. ***Henry C. Baggett, J. Butler, T. Hennessy, D. Bruden, D. Parks, D. Hurlburt, A. Parkinson***
Household Factors Influencing Adult Carriage of *Streptococcus pneumoniae* (SP) among Alaska Natives, 2000 and 2001.

Background: Alaska Natives have high rates of invasive pneumococcal disease, and approximately half of disease in all age groups is caused by serotypes in the heptavalent pneumococcal conjugate vaccine (PCV7). PCV7 reduces SP invasive disease and carriage of PCV7 serotypes in children age <5 years, for whom the vaccine is recommended in Alaska. It is unknown whether vaccinating children will also reduce carriage or invasive disease in non-vaccinated adults through reduced transmission of PCV7 serotypes. Prior to widespread use of PCV7 in Alaska, we assessed the influence of household demographics on SP carriage in adults to understand the potential for herd immunity from PCV7 usage.
Methods: Community-wide SP nasopharyngeal carriage surveys were conducted in Alaskan villages in April/May of 2000 and 2001. Household demographics were collected during interviews using a standardized questionnaire.
Results: Of persons age <5 years, 53.2% (308/579) were colonized with SP compared to 46.6% (954/2046) of those age 5-19 ($p<0.01$) and 17.5% (392/2236) of those $\geq$ 20 ($p<0.01$). Adult (age $\geq$ 20) SP carriers lived in more crowded households than non-carriers (1.3 vs. 1.0 persons/room, $p<0.01$). Controlling for household density, 175 (22%) of 815 adults living with a child <5 carried SP compared to 217 (15%) of 1421 not living with a child <5 (OR=1.3[95%CI: 1.0, 1.7]); the likelihood of carriage increased with the number of household members age <5 (1 household member < 5, 18%[99/539]; 2 household members, 26%[55/214]; $\geq$ 3 household members, 34%[21/62]; $p<0.01$).
Conclusions: Household crowding and living with a child <5 independently increase the risk of SP carriage among Alaska Native adults. Widespread use of PCV7 in children <5 may affect SP carriage and disease among adult household members.

Key words: *Streptococcus pneumoniae*, Alaska, heptavalent pneumococcal conjugate vaccine, family

Neonatal, Infant, and Child Health

P6. ***Wanda D. Barfield, S. Iyasu, K. Tomashek***
Characteristics of Stillbirths and Early Neonatal Deaths — United States, 1995 – 1998.

Background: Nearly 13,000 stillbirths (fetal deaths at $\geq$ 28 weeks gestation) occur annually in the United States, but they are seldom studied. Little is known how stillbirths differ from early neonatal deaths (deaths within the first week of life). We examined these deaths and associated maternal risk factors to help focus on prevention strategies.
Methods: We analyzed fetal and early neonatal deaths at $\geq$ 28 weeks gestation using U.S. fetal death and linked infant birth-death certificate data (1995-1998). We used univariate analyses and odds ratios to

compare stillbirths with early neonatal deaths by number, rate (deaths per 1,000 live births + fetal deaths), selected maternal and fetal/infant characteristics, and maternal medical conditions and complications.
Results: During 1995-1998, there were 53,103 stillbirths (rate = 3.4) and 19,941 early neonatal deaths (rate = 1.8). The mother's mean age and education were similar for both groups. Mothers who had stillbirths were less likely to have had prenatal care than mothers with early neonatal deaths (4.5% vs. 3.6%). Stillborn infants were 115 grams lighter at birth than neonates who died (2,151g vs. 2,266g, $p < 0.01$). Stillbirths were more common than early neonatal deaths among women who smoked or used alcohol (OR= 1.2 and 1.4, respectively). Mothers with selected medical risks (anemia, diabetes, chronic hypertension, pregnancy-associated hypertension) and complications (placental abruption, cord prolapse, seizures during labor) were more likely to have stillbirths than neonatal deaths. These factors were more common among black mothers than among women of other races.
Conclusions: Poor maternal health and high-risk behaviors increase the risk for stillbirths. Prevention should focus on maternal health to reduce stillbirths and associated racial disparities.

Key words: stillbirths, fetal deaths, neonatal deaths, birth outcomes, blacks, maternal health

P7. ***Mary M. Dott, S. Rasmussen, L. Wong***
Congenital Diaphragmatic Hernia: Risk Factors and Outcome — Metropolitan Atlanta, 1968–1999.

Background: Congenital anomalies are a leading cause of infant mortality in the United States. Congenital diaphragmatic hernia (CDH), a serious defect that allows abdominal contents to herniate into the thoracic cavity and frequently results in death, affects about 1,000 U.S. infants each year. The etiology of CDH is unknown. We sought to determine risk factors, examine associated defects, and assess the current mortality of CDH.
Methods: We conducted a cohort study using the Metropolitan Atlanta Congenital Defects Program, a population-based birth defects surveillance system, for the years 1968–1999. Infants with CDH were classified into groups: those with an isolated defect, those with multiple defects or infants with syndromes. Risk factors were analyzed for the isolated group. To document vital status, we used data from hospital records, Georgia vital records, and the National Death Index.
Results: CDH occurred in 2.4 per 10,000 births. Males were at higher risk for CDH (risk ratio [RR]=1.6, 95% confidence interval [CI]=1.2–2.2). Infants with CDH were more likely to be premature (RR=2.6, 95% CI=1.8–3.8). About one third of infants had an additional major defect, most often in the cardiovascular and musculoskeletal systems. Of infants with CDH, 7% had known syndromes, most commonly chromosome abnormalities. During the study period, the percentage of children with CDH who died declined from nearly 80% (1968–1971) to about 40% (1996–1999).
Conclusions: Additional defects and known syndromes are commonly associated with CDH. Consideration of these findings is important for clinicians caring for infants with CDH and may provide insight into etiology. Despite new treatments, the death rate from CDH remains substantial, highlighting the need to identify mechanisms for primary prevention.

Key words: diaphragmatic hernia, birth defects, infant mortality, cohort study, prematurity

P8. ***Dennis Y. Kim, A Yomai, L Brown, D Huff, B Bowen, A Sowell***
Anemia and Elevated Blood Lead Levels — Chuuk State, Federated States of Micronesia, 2001.

Background: Anemia, the most common micronutrient deficiency worldwide, and elevated blood lead levels (EBLLs) are often related. Because of concern about poor nutrition in Chuuk and reported lead exposure in other states of Micronesia, the Ministry of Health requested assistance in determining the prevalence of and risk factors for anemia and EBLLs in Chuuk.
Methods: Within 20 randomly selected villages in Chuuk we obtained a simple random sample of children aged 2-6 years, administered risk assessment questionnaires to their caregivers, and obtained venous blood samples from children and their caregivers to determine hemoglobin and lead levels. We defined anemia as hemoglobin <11 g/dL for children aged <5 years, <11.5 g/dL for children aged $\geq$ 5 years,

<12 g/dL for women, and 11 g/dL for pregnant women, and EBLL as ≥ 10 µg/dL. Data were analyzed using SAS and SUDAAN.

Results: Children's mean hemoglobin and geometric mean lead levels were 11.46 (SE=0.11) g/dL and 3.99 (SE=0.59) µg/dL, respectively among the 251 total children. The prevalences of anemia and EBLLs were 36% (SE=5%) and 20% (SE=5%), respectively. Anemic children were more likely to report illness in the past month (OR=3.75, 95%CI=1.59-8.86) and have a family member who smoked (OR=2.75, 95%CI=1.50-5.04). Children whose caregivers had EBLLs were more likely to have EBLLs (OR=16.13, 95%CI=2.98-87.22). Melting batteries were associated with EBLLs for children (OR=3.14, 95%CI=3.14-1.03-9.56, respectively).

Conclusion: The prevalence of EBLLs among Chuukese children was twice that of US children. More than one third of Chuukese children have anemia, and one fifth have EBLLs. Smoking and melting batteries are preventable exposures. Children with anemia are more likely to have poor, health indicating the need for improved nutrition.\

Key words: anemia, lead poisoning, children

P9. ***Kristina M. Zierold, J. Havlena, H. Anderson***

Rate of Decline of Blood Lead Levels in a Lead-Poisoned Population of Children 0 – 6 Years Old – Wisconsin, 1995.

Background: Childhood lead poisoning results in central nervous system, hematologic and kidney damage. CDC recommends that within 10 days of detection of a blood lead level (BLL) ≥20 µg/dL, public health officials begin environmental intervention. A report in 2001 suggests that BLLs remain elevated for longer than 1.5 years, but little is known about BLL decline rates after initial case identification or factors affecting that rate.

Methods: Data from Wisconsin's laboratory-based BLL reporting system for 1995 were analyzed for all children aged 0-6 years whose maximum BLL was 20-40 µg/dL (n=435). By using each child's successive BLL tests, the number of days for BLLs to drop to 50% of the maximum BLL was determined. We used a case-control design to investigate predictors of rate of BLL decline for a subset of children for whom housing intervention data were available (n=242). Case-patients were children whose decline took >1.5 years (n=116) and controls were children whose BLL decline took ≤1.5 years (n=127).

Results: The mean time from maximum BLL to 50% of the maximum was 597 days. While the children were under surveillance, 242 homes were remediated; 38% (n=93) of dwellings were remediated within 365 days; 38% (n=92) required ≥4 years. The median time from maximum BLL to completed intervention was 622 days. Having a decline that took >1.5 years was associated with completion of housing remediation taking >365 days (odds ratio = 2.4, 95% confidence interval 1.4-4.1.). Other variables (age, race, sex, maximum BLL) studied were not predictive.

Conclusions: Without remediation, continued lead exposure slows the rate of children's BLL decline. Impediments to rapid dwelling remediation must be overcome.

Key words: lead, childhood lead poisoning, lead abatement

Parasitic, Vector-Borne, and Viral Diseases

P10. ***Thomas R. Handzel, J. Sheppard, J. Tufa, D. Addiss, A. Allman, K, Kudish, M. Lovegrove, P. Lammie***

Possible Re-Emergence of Lymphatic Filariasis — American Samoa, 2001.

Background: Lymphatic filariasis (LF), currently targeted for global elimination, has been a significant public health problem in the western Pacific for many years. The parasite is transmitted by mosquitoes, which ingest microfilaria (immature forms of the worm) in the blood. The World Health Organization recommends annual mass treatment with antifilarial drugs for 5 years to eliminate transmission. In American Samoa, mass treatment with diethylcarbamazine (DEC) decreased microfilarial prevalence from 26% in 1963 to 0.4% in the late 1960s, at which point the control program was discontinued. In a recent serosurvey, 16% of the population tested positive for filarial antigen using a newly developed, sensitive

immunochromatographic assay. We investigated the possible re-emergence of LF and risk factors for infection.

Methods: Finger-prick blood was collected from 1051 persons in four sentinel communities, and tested for microfilariae and filarial antigen. Potential risk factors were assessed with a questionnaire.

Results: Mean prevalence of microfilaremia and antigenemia was 2.5% (range 0%-6.7%) and 10.5% (range 0.5%-21.4%) in the 4 sentinel communities. Microfilaremia prevalence was higher for males (4.1%) than females (1.4%, p=0.007); microfilaremia and antigenemia increased with age. Among persons >60 years old (90% long-term residents of American Samoa), the prevalences of microfilaremia and antigenemia were 12.5% and 30.4%. Prevalence of infection was correlated with self-reported contact with mosquitoes (p=0.007); screened houses appeared to be protective (OR=0.54, 95% confidence interval = 0.33, 0.90).

Conclusions: Despite >5 years of mass treatment with DEC, transmission of lymphatic filariasis continues in American Samoa, at levels unparalleled in this region of the Pacific. Mass treatment was restarted in 2001. Careful surveillance and monitoring are essential to prevent premature program cessation and recrudescence of lymphatic filariasis.

Key words: lymphatic filariasis, microfilaria, risk factors, American Samoa

P11. ***John M. Hayes, J. Rigau-Pérez, P. Reiter, P. Effler, L. Pang, V. Vorndam, S. Hinten, K. Mark, M. Myers, K. Street, L. Soler-Bergau, C. Meyer, M. Amador, M. Napier, G. Clark, D. Gubler***
Risk Factors for Infection During a Dengue-1 Outbreak — Maui, Hawaii, 2001.

Background: Autochthonous dengue transmission, last identified in Hawaii in 1945, was detected in East Maui in September 2001. Entomologic surveys revealed that *Aedes albopictus* was responsible for transmission.

Methods: To identify risk factors for infection, we conducted an environmental and epidemiologic survey of all households in communities A and B (60 and 49 households, respectively), with dengue fever attack rates according to surveillance of 19.3% (26/135) and 0.4% (1/229), respectively. Recent infection was defined as detectable anti-dengue IgM antibodies in persons without recent foreign travel, or IgG antibodies in persons <56 years old without foreign travel or anti-flavivirus vaccinations.

Results: Communities A and B differed in household participation (65% vs. 90%), median household size (2 vs. 4 persons), lot size (2.8 vs. 0.8 acres), and incidence of recent infection among those agreeing to phlebotomy (38% [27/72] vs. 4% [5/131]). After adjusting for community, persons who resided on properties with no visible neighboring house (OR=6.84, 95%CI =1.55-30.20), lived in houses without window screens (OR=4.22, 95%CI=1.30-13.68), lived on properties with taller bushes (feet) (OR=1.09, 95%CI=1.01-1.16), and had greater vegetation cover near the house (percentage) (OR=1.02, 95% CI=1.00-1.03) were more likely to have had recent infection. In a multivariate logistic regression analysis, residing on properties with no visible neighboring house (OR=7.09, 95%CI=1.54-32.59) and living in houses without window screens (OR=6.85, 95%CI=1.35-34.80) were risk factors for infection.

Conclusions: Nearly 40% of community A residents were infected, a proportion nearly 10-fold higher than community B. Natural vegetation, as measured by neighboring house visibility, increased the likelihood of dengue infection, presumably due to increased habitat for *Aedes albopictus*. Window screens may reduce the risk of dengue infection in this setting.

Key words: dengue, risk factors, vectorborne disease, survey

P12. ***Steven R. Hinten, G. Beckett, K. Gensheimer, E. Pritchard, T. Courtney, S. Sears, J. Woytowicz, D. Preston, R. Smith, P. Rand, E. Lacombe, M. Holman, C. Lubelczyk, P. Tassler, A. Beelen, J. Piesman, G. Campbell, A. Marfin***
Outbreak of Powassan Encephalitis — Maine and Vermont, 1999 – 2001.

Background: Powassan (POW) virus, a tick-borne flavivirus maintained in a transmission cycle involving primarily woodchucks, is a rare but serious cause of human encephalitis. During 1958-1998, 27 POW encephalitis cases were reported from the United States and Canada. *Ixodes cookei* appears to be the principal vector, but ecologic conditions associated with human risk are poorly understood. After two cases

were diagnosed in Maine in 2000 and 2001, additional case finding and an environmental investigation were undertaken.

Methods: The case definition was acute encephalitis with onset in 1999-2001 and serologic confirmation of recent POW virus infection. Case finding involved a retrospective review of CDC's arbovirus laboratory database. The investigation included a medical records review and ecologic investigation of case-patients' homes, including testing of local mammals and ticks for evidence of POW virus infection.

Results: Four cases in Maine (three) and Vermont (one) residents were identified (75% males; median age, 60 years [range, 25-70]). All experienced acute onset of profound muscle weakness, confusion, and other severe neurologic signs; high fever was common. All case-patients recovered from acute disease, but developed long-term neurologic sequelae. Four of nine mammals sampled peridomestically had POW virus neutralizing antibody. *Ix. cookei* were found on woodchucks and skunks and questing in grassy areas; all were negative for POW virus.

Conclusions: These results suggest that a woodchuck-*Ix. cookei* cycle is important in the ecology of POW virus. The unexpected finding of questing *Ix. cookei* outside of burrows has implications for increased risk of human exposure to POW virus. Because no vaccine or specific therapy is available for POW encephalitis, the cornerstone of prevention is personal protection from ticks and elimination of peridomestic wild mammals.

Key words: Powassan virus, flavivirus, arbovirus, encephalitis, case report, ixodid ticks, mammals, environmental sampling, epidemiology

P13. *Marta A. Guerra, A. Curns, C. Rupprecht, C. Hanlon, W. Ivy III, J. Childs*
Epidemiology of Raccoon and Skunk Rabies in the Eastern United States, 1981-2000.

Background: Since 1981, an epizootic of raccoon rabies has spread through the eastern USA. A concomitant increase in the incidence of skunk rabies may affect current intervention strategies and oral rabies vaccine control programs. The objectives of this study were to determine the temporal and spatial characteristics of rabies epizootics among raccoons and skunks, and investigate the evidence for independent rabies cycling in skunk populations versus the sporadic spillover of rabies from raccoons.

Methods: Surveillance data from 1981 through 2000 were obtained from health departments of 11 eastern states from Massachusetts to North Carolina. The numbers of rabid raccoons and skunks submitted to county health departments per month were used to construct county-specific epizootic curves for time series analyses and to define intervals of epizootic versus enzootic rabies in both species.

Results: A high degree of spatial correlation was found between epizootics among raccoons and skunks in regions where the raccoon-associated variant of rabies virus was enzootic. The first raccoon epizootic was significantly larger (median=40, $p<0.05$) than subsequent raccoon epizootics, and also significantly greater than the first skunk epizootic (median=10, $p<0.05$). Subsequent epizootics among the species were similar in size and duration, with a significant cross-correlation ($p<0.05$) between the numbers of rabid raccoons and skunks, even in counties where cases of rabies in skunks now outnumber cases in raccoons.

Conclusions: Rabies in skunks and raccoons is temporally and spatially correlated in the eastern USA. Currently there is insufficient evidence to conclude that independent maintenance of rabies virus occurs among skunks where raccoon rabies virus variant is enzootic. Future investigations should assess the role of environmental factors and evidence of genetic changes in rabies virus variant-associated host-switching.

Key words: rabies, epizootic, raccoon, skunk

P14. *Michael S. Phillips, D. Weiss, F. Mostashari, J. Kellachan, I. Poshni, M. Layton*
Fight the Bite: Risk Factors for West Nile Viral Meningoencephalitis — Staten Island, New York, 2000.

Background: West Nile virus (WNV) emerged as a potentially fatal cause of meningoencephalitis in New York City in 1999, spreading throughout the eastern United States in subsequent years. In 2000, Staten Island, New York, was the epicenter of the WNV outbreak. Understanding potential risk factors for WNV disease is critical for developing prevention strategies. We conducted a case-control study to determine risk factors for acquiring WNV disease.

Methods: A case-patient was defined as a Staten Island resident with laboratory confirmed WNV encephalitis/meningitis. Each case-patient's household was matched to ten randomly selected households in the case-patient's neighborhood. A questionnaire to determine mosquito exposure and personal and household mosquito-protection measures was administered to consenting household members aged > 18 years. Sera from controls were tested for WNV antibodies.
Results: We enrolled nine case-patients and 128 controls. All controls tested negative for WNV antibodies. Case-patients were more likely to have visited a park, beach, or wetland (PBW) (case: 9/9 [100%]; control: 79/128 [62%]; matched odds ratio [MOR]=undefined; p=0.02). Case-patients only visited a PBW during the daytime. No difference existed in daytime hours spent at a PBW. Controls used more personal-protective measures overall and while attending a PBW (overall: MOR=4.6, 95% confidence interval [CI]=1.2–18.2; PBW: MOR=5.2, 95% CI=1.2–23.1). Control households used more protective measures, including window screens, door screens, and air conditioning, than case households (MOR=6.25, 95% CI=0.9–50).
Conclusions: Persons who visited a PBW during the day or failed to adhere to household and personal-protective measures were at increased risk for infection. Public health efforts should highlight these measures to prevent WNV infection in the future.

Key words: West Nile Virus, meningoencephalitis, case-control study

P15. ***Kathleen G. Julian, J. Mullins, A. Olin, H. Peters, S. Oberste, J. Lovchik, A. Bergmann, R. Brechner, R. Myers, A. Marfin, G. Campbell***
Aseptic Meningitis Outbreak in an Area of Intense West Nile Virus Epizootic Activity — Baltimore, 2001.

Background: West Nile virus (WNV) is an emerging cause of central nervous system infections among humans and animals in the United States. Because human WNV surveillance has focused on encephalitis, the incidence of WNV meningitis is less clear. In the summer of 2001, an apparent outbreak of aseptic meningitis during an intense WNV epizootic in Baltimore, Maryland, prompted investigation. The objective was to determine the relative contributions of WNV and enteroviruses that commonly cause aseptic meningitis.
Methods: Aseptic meningitis cases with onsets from June 1-September 30, 2001, were identified by medical record review at six Baltimore hospitals. Available CSF and serum specimens were tested for WNV IgM antibody and cultured for enterovirus. At five of these hospitals, discharge diagnosis codes were reviewed for the season June 1-September 30 from 1998-2001.
Results: At the six hospitals, 114 aseptic meningitis cases were identified. At the five hospitals where discharge diagnoses were reviewed, the number of aseptic meningitis codes increased by 69% during June 1-September 30, 2001, compared with the seasonal average for 1998-2000. Of 55 patients with CSF and/or serum specimens available for WNV IgM antibody testing, all were negative. Of 47 patients with CSF specimens available for enteroviral culture, 26 (55%) were positive. Six enteroviral serotypes were isolated from CSF, rectal, and nasopharyngeal swab specimens. Echovirus 13 was identified in 14 (45%) of 31 enteroviral meningitis cases with completed serotyping.
Conclusions: Enteroviruses, including the previously rarely detected echovirus 13, caused most aseptic meningitis cases in Baltimore in the summer of 2001. No WNV meningitis cases were identified. Despite an intense WNV epizootic, the public health impact of WNV meningitis appeared to be low.

Key words: meningitis, aseptic—epidemiology; enterovirus infections; echovirus infections; West Nile fever; communicable diseases, emerging; disease outbreaks

P16. ***Joseph B. McLaughlin, J. Middaugh, E. Funk, T. Lynn, T. Török***
Outbreak of Echovirus 18 Meningitis at a Summer Camp — Alaska, 2001.

Background: During July through October 2001, the largest identified outbreak of aseptic meningitis in Alaska since 1982 occurred in Prince William Sound, and involved attendees of a remote summer camp. We conducted an investigation to determine the extent of the outbreak, the etiology, and risk factors associated with illness.

Methods: We defined a case of aseptic meningitis as a camp attendee (CA), or someone exposed to a CA, from July through October with headache, nausea or vomiting, and at least one of the following: photophobia, sonophobia, stiff neck, feverishness or chills, myalgias, cerebrospinal fluid lymphocytosis with sterile bacterial cultures, or a positive enteroviral culture. We conducted a retrospective cohort study of CAs using a telephone questionnaire. Additional case-patients outside of the cohort were located through active surveillance by asking CAs and case-patients to report ill contacts, and through passive surveillance. Camp water samples were analyzed for fecal coliforms.
Results: From July through October, we identified 80 case-patients who attended (n=33) or were contacts of someone who attended (n=47) the camp. Thirty-three (41%) were male; the median age was 13 years (range: 3-59 years). Retrospective cohort study results indicated a 38% attack rate among children; relative risk of a child being a case-patient was 6.7 (95% confidence interval=1.7-26.5). Echovirus 18 was isolated from specimens submitted from 11 patients. High fecal coliform levels were found in camp tap water.
Conclusions: This outbreak was caused by a relatively rare enterovirus, echovirus 18. Water contamination, crowded living conditions, and poor sanitary conditions at the camp might have caused high viral exposure levels leading to high attack rates.

Key words: viral meningitis, echovirus 18, attack rate, contamination

Monday Afternoon — April 22, 2002

1:30 Reproductive Health: Problems of Childbearing. Moderator: Gilberto F. Chavez

1:35 *Sara J. Whitehead, C. Berg, J. Chang*
Cardiomyopathy: Emerging Cause of Pregnancy-Related Death? — United States, 1979 – 1997.

Background: Cardiomyopathy in the peripartum period is a poorly understood condition with a high mortality rate (18% to 56%) and often with severe long-term sequelae such as impaired cardiac function, sometimes requiring heart transplantation. Since 1979, cardiomyopathy has caused an increasing proportion of reported pregnancy-related deaths. To better understand this emerging maternal health issue, we used national data from 1979-1997 to describe trends and risk factors for pregnancy-related deaths due to cardiomyopathy.
Methods: The national Pregnancy Mortality Surveillance System uses death certificates and matching birth and fetal death certificates. A pregnancy-related death is the death of a woman occurring during or within 1 year of pregnancy and caused by pregnancy, its treatment, or complications. The pregnancy-related mortality ratio (PRMR) is the number of pregnancy-related deaths per 100,000 live births.
Results: During the years 1979-1984, cardiomyopathy caused 3% of all pregnancy-related deaths, compared with 7.6% in 1991-1997. During 1991-1997, 245 women died of pregnancy-related cardiomyopathy. Almost half of them died >42 days postpartum. The PRMR due to cardiomyopathy rose from 0.29 to 0.88 between 1979 and 1997, paralleling the rise in PRMR due to other causes of death occurring 42-365 days postpartum (from 0.36 to 0.99). The PRMR due to cardiomyopathy was 6.4 times higher for black women than for white women and 4.1 times higher for women with multiple vs. singleton births.
Conclusions: Reported deaths due to cardiomyopathy may be increasing because of better case ascertainment, particularly through linkage of vital records and use of check-boxes to identify deaths >42 days postpartum. Preventing these deaths will require a better understanding of the risk factors for and etiology of cardiomyopathy in pregnancy.

Key words: pregnancy, myocardial diseases, puerperal disorders, risk factor

1:55 *Naile Malakmadze, L. Zimmerman, M. Joldubaeva A. Uzicanin, S. Reef, P. Strebel, V. Caceres*
Rubella Antibody Seroprevalence Among Women of Childbearing Age — Kyrgyzstan, 2001: Implications for a Rubella Vaccination Strategy to Prevent Congenital Rubella Syndrome.

Background: The purpose of rubella immunization is to prevent of rubella infection and congenital rubella syndrome (CRS), which affects up to 90% of infants born to mothers infected with rubella in early pregnancy. Because introduction of childhood rubella immunization may shift the incidence of rubella infection toward older persons possibly increasing the risk of CRS, WHO recommends that countries introducing childhood immunization ensure high rubella immunity among women of childbearing age (WCBA). In Kyrgyzstan, routine childhood rubella vaccination will begin in 2002. To assist in developing a comprehensive CRS prevention strategy, we conducted a seroprevalence study among WCBA to determine age-specific susceptibility.
Methods: Women aged 15-39 years attending prenatal clinics in Issik-Kul, Naryn and Talas oblasts provided blood samples in late 2001. Samples were tested at the national laboratory for rubella-specific IgG antibodies using an indirect enzyme immunoassay following the manufacturer's specifications. Rubella susceptibility was analyzed by five-year age strata, targeting at least 165 women in each stratum. National data on birth distribution by maternal age were reviewed.
Results: Of 937 women participating in the study, 7.9% (95% CI, 6.3%-9.9%) had no IgG antibodies against rubella. Rubella susceptibility by age stratum ranged from 6.1% (95% CI, 3.0%-10.9%) to 10.6%

(95% CI, 6.6%-15.9%); however, differences were not significant ($p<0.05$). Women under 35 years old account for 89% of all births.
Conclusions: Our results suggest that a substantial proportion of women remain at risk of CRS in their offspring. Among WCBA susceptibility does not vary significantly across the age groups. Therefore, we recommend rubella vaccination of women up to age 35 and selective vaccination of older women who are planning pregnancy.

2:15 ***Julia C. Rhodes, K. Schoendorf, J. Parker***
Association Between High Pregnancy Weight Gain, Macrosomia, and Trends in Cesarean Section — United States, 1989 –1999.

Background: Following a decade of consistent decline, US cesarean section rates recently increased. To determine if this increase is attributable to women gaining higher than recommended weight during pregnancy with subsequent high birthweight infants requiring delivery by c-section, we examined trends in pregnancy weight gain and c-section, accounting for infant birthweight.
Methods: Analysis of birth certificate data from the 1989-1999 US Natality Files was restricted to first birth, singleton infants >37 weeks gestation to avoid confounding by repeat c-section, complications of multi-gestational pregnancy, and prematurity. As current guidelines recommend, high pregnancy weight gain was defined as >40 lbs. and macrosomia as birthweight >4000g.
Results: From 1989-1997, the c-section rate decreased from 24.4% of all births to 20.9%, then increased to 21.9% by 1999. High weight gain rose steadily from 18.6% to 24.2%. There was a 20.2% decline in macrosomic infants among high weight gain women compared to an 11.1% decline among other women, though the absolute risk remained substantially greater among high weight gain women (e.g., 14.2% vs 8.9, in 1999). C-section rates declined by 17.8% among high weight gain women compared to 10.6% among other women; absolute risks in 1999 were 24.9% and 21.9%, respectively. Regardless of weight gain, macrosomic infants were consistently at higher risk of c-section compared with smaller infants. Overall, women gaining >40 lbs. accounted for 23.2% of c-sections in 1989 and 27.6% in 1999.
Conclusions: Women gaining excessive weight during pregnancy account for a growing proportion of c-sections because their numbers are increasing and, despite their rapidly declining macrosomia and c-section rates, they remain at high risk. Clinicians should encourage pregnant women to limit weight gain to current guidelines.

Key words: cesarean section, weight gain, birth weight, vital statistics

2:35 ***Robert D. Newman, D. Jima, A. Hailemariam, A. Rietveld, B. Nahlen, D. Kebede, R. Steketee, M. Parise***
Burden of Malaria during Pregnancy in Areas of Unstable Transmission — Ethiopia, 2000 – 2001.

Background: Malaria during pregnancy (MDP) leads to adverse outcomes in mothers, fetuses, and neonates; outcome patterns vary with transmission intensity and malaria species. In sub-Saharan Africa, most studies involve high and stable transmission (ST) settings with *Plasmodium falciparum*, where placental parasitemia (PP) leads to low birth weight (LBW), and increased risk of infant death. Little is known about the epidemiology of MDP in areas of unstable (epidemic-prone) transmission (UT), or areas where *Plasmodium vivax* infection is common.
Methods: We conducted a cross-sectional study of women at delivery during high-transmission season in Ethiopia, where *P. vivax* accounts for 40% of infections, and UT predominates.
Results: In three sites with UT, and one site with ST, we identified PP in 37 (3.6%) of 1018 delivering women; *P. vivax* accounted for 6 (16.2%) of these 37. PP was identified more frequently at the ST site (14/185; 7.6%) than at UT sites (23/833; 2.8%; P=0.002). Primigravidae had higher rates of PP (13.1%) than secundigravidae (6.1%) or multigravidae (4.0%) in the ST site (χ^2 trend, P=0.05). PP rates did not differ by gravidity at UT sites. LBW was more common among women with PP (8/32; 25%) than among women without PP (77/944; 8.2%; P=0.0001).
Conclusions: We found low PP rates in all sites, but an increased risk of LBW for infants born to women with PP. In Ethiopia, malaria contributes to adverse outcomes despite low and often unstable transmission. Given such low PP rates, standard preventive strategies used in high-transmission regions

(such as intermittent preventive treatment), may not be cost-effective. Innovative approaches focusing on epidemic preparedness may be needed to address the problem of MDP in settings such as Ethiopia.

Key words: Malaria, *Plasmodium falciparum,* pregnancy, infant, low birth weight, Ethiopia

3:15 HIV and STD Investigations. Moderator: Ida M. Onorato

3:20 *Lori M. Newman, S. Wang, H. Weinstock*
Emergence of Ciprofloxacin-Resistant *Neisseria gonorrhoeae:* Prevalence and Risk Factors for Infection — United States, 1998 – 2000.

Background: *Neisseria gonorrhoeae* is an important cause of pelvic inflammatory disease and infertility. The increase in ciprofloxacin-resistant gonococci (CipRGC), initially reported in Asia and more recently in Hawaii, is a significant public health concern since fluoroquinolones such as ciprofloxacin are widely used oral treatments for gonorrhea. Identifying risk factors for infection with CipRGC may better inform treatment decisions of clinicians and limit the spread of resistant gonorrhea.
Methods: In 1998-2000, the Gonococcal Isolate Surveillance Project (GISP) performed antimicrobial susceptibility testing on isolates from the first 25 men with urethral gonorrhea attending STD clinics each month in 29 U.S. cities. Antimicrobial susceptibilities and corresponding patient demographic and clinical characteristics were compared to identify risk factors for CipRGC.
Results: Of 15,353 gonococcal isolates submitted to GISP, 42 (0.3%) were CipRGC: 15 (36%) in Honolulu, 20 (48%) in other west coast cities, and 7 (17%) in other cities. The proportion of CipRGC was higher in Honolulu than other sites (11% vs. 0.2%, $p<0.0001$) and in persons >30 years old (0.5% vs. 0.2%, $p=0.0003$). Excluding Honolulu, the proportion of CipRGC was higher in west coast cities than other continental U.S. sites (0.6% vs. 0.1%, $p<0.0001$) and in Asian/Pacific Islanders than other races (6.5% vs. 0.1%, $p<0.0001$). Presence of symptoms, sexual orientation, number of gonorrhea episodes over the past 12 months, and history of ever having gonorrhea showed no significant association with CipRGC.
Conclusions: The emergence of CipRGC in the west coast beyond Honolulu, persons >30 years old, and Asian/Pacific Islanders may require modification of already limited gonorrhea treatment options. Aggressive monitoring of the eastward spread of CipRGC will be necessary to ensure that patients receive effective antimicrobial therapy.

Key words: gonorrhea, drug resistance, ciprofloxacin, risk factors

3:40 *Toya V. Russell, A. Do, P. Sullivan*
HIV/AIDS Knowledge and Sex Behavior Among Chuukese Living in the Outer Islands — Micronesia, 2001.

Background: Globally, HIV/AIDS-related morbidity and mortality are increasing, especially in developing countries. In early 2001, the first two cases of locally acquired HIV infection were diagnosed on Chuuk's outer islands (population ≈1850). CDC was asked to assist with behavioral surveillance and HIV voluntary counseling and testing to direct prevention.
Methods: During the first visit to the islands, consenting volunteers were surveyed about HIV-related knowledge, attitudes, and sex behaviors (past 12 months). During the second visit, rapid testing was offered. Participants received HIV education from trained counselors; a random 25% were offered a post-education survey when they returned for posttest counseling. Descriptive analyses and chi-square tests were performed.
Results: Three-hundred thirty-four participated in the first survey: 52% female, 50% <12 years education, and median age 33 years. Among 181 sexually active persons, 13% of women and 58% of men had $\geq$ 2 sex partners; 14% of men had a same-sex partner. Although 81% understood that unprotected sex increases risk for HIV transmission, only 38% of men and 60% of women reported condom use. All 370 persons who consented to rapid testing were HIV-negative. Of 82 persons offered the post-education survey, 57 (70%) responded. A lower proportion of post-education than initial survey respondents reported being afraid of HIV-infected persons (72% vs. 40%, $p < 0.05$) or feeling that HIV-infected persons should be locked up (58% vs. 25%, $p < 0.05$).

Conclusions: Despite the low sero-prevalence, risky sex behaviors in this small, isolated population create potential for rapid spread of HIV. Differences in HIV knowledge and attitudes reflected by the initial and post-education surveys suggest a positive effect of education. Similar surveys should be repeated to monitor behaviors and direct prevention efforts.

Key words: AIDS, HIV counseling and testing, behavioral surveillance, Micronesia

4:00 ***Lisa N. Pealer, D. Newman, T. Peterman, B. Dillon, M. Iatesta, M. Kamb, G. Bolan, J. Zenilman, J. Douglas, K. Malotte, Project RESPECT Study Group***

Effects of Counselor Characteristics on Incident Sexually Transmitted Disease After an HIV Counseling Intervention — Project Respect, 1993 –1996.

Background: Client-centered HIV counseling has changed behavior and reduced sexually transmitted diseases (STDs) in research study participants. However, questions remain about what qualifications counselors need and whether to match counselors with clients by gender or race.
Methods: Data were analyzed from Project Respect, a randomized controlled trial of HIV counseling interventions in STD clinics. For this analysis, participants received client-centered counseling and completed at least one follow-up STD examination within 12 months (gonorrhea, chlamydia, syphilis, HIV, and trichomoniasis [women only]). After adjusting for site, baseline STD, and client characteristics, generalized estimating equations were used to identify counselor characteristics associated with incident STDs.
Results: Of 32 counselors, 41% were White; 41%, African American; and 13%, Hispanic; 69% female; 19% completed high school; 59%, college; and 19%, graduate school. Counselors' experience ranged from 2 to 731 (mean = 223.6) counseling sessions conducted. In 54% of counseling sessions counselor and client were the same race; 47%, same gender; 26%, same race and gender; and 97% of clients were counseled by the same person each visit. Of 2,239 clients, 20% returned with a new STD; 88% completed the intervention. No counselor characteristics were associated with intervention completion. There was no significant association between client incident STDs and counselor race (African American AOR 1.0, Hispanic AOR .99), gender (female AOR .94), education (college AOR .94, graduate 1.0), counseling experience (AOR .99), or having same counselor for all sessions (AOR 1.4). Shared client-counselor characteristics (gender AOR 1.0, race AOR .78, race and gender AOR 1.1) were not associated with incident STDs.
Conclusions: Counselors for client-centered HIV counseling programs do not need advanced degrees. Matching counselors with clients by gender or race is unnecessary.

Key words: counseling, interpersonal relations, primary prevention, sexually transmitted diseases

4:20 ***Omotayo O. Bolu, C. Lindsey, T. Peterman, M. Kamb, G. Bolan, J. Zenilman, J. Douglas, K. Malotte, J. Rogers, for the Project RESPECT study group.***

Once is Not Enough: Re-Screening Sexually Transmitted Disease (STD) Clinic Patients in Six Months to Detect New, Unrecognized STDs — United States, 1993 – 1996.

Background: Sexually transmitted disease (STD) clinic clients are at risk for subsequent STDs, which may be unrecognized and untreated, thus contributing to ongoing STD transmission. We investigated whether scheduled follow-up visits would help detect new, unrecognized STDs.
Methods: We analyzed data collected during 1993–1996 in a 5-city counseling trial for STD clinic patients. Of 5758 participants at baseline, 4328 were randomly assigned to return for scheduled STD examination at 6 months (161-219 days after baseline visit); 1430 were not scheduled. Participants in both groups could return anytime they had STD symptoms. To estimate STDs that would have been missed if clients were not scheduled for 6-month follow-up (unrecognized STDs), we subtracted new STDs in the unscheduled group (multiplied by 3.026 to adjust for group size at baseline) from new STDs in the scheduled group. STDs diagnosed before and after the 6-month period were not counted. Similar calculations were done to identify predictors of unrecognized STDs.
Results: During the 6 month period, 2722 (63%) of the scheduled clients and 95 (7%) of the unscheduled clients returned. A total of 214 clients (202 scheduled, 12 unscheduled) had $\geq$1 new STD: 60% chlamydia, 27% gonorrhea, 8% chlamydia and gonorrhea, 4% syphilis, and 1% other. Thus, [202-(12x3.026)]=166

clients returning in the scheduled group (6%) would not have had their STD diagnosed had they not been scheduled for follow-up. Unrecognized STDs were more common among persons with baseline STD (12%) vs. no baseline STD (4%) (P<0.00003), and age ≤25 years (8%) vs. >25 (5%) (P<0.001), but did not differ by gender.
Conclusions: Clients with baseline STDs should return for 6-month follow-up exam because many will have new, unrecognized infections.

Key words: unrecognized, sexually transmitted disease, clients, follow-up

4:40 ***Tanya T. Sharpe, L. Lee, M. McKenna***
Trends in Injection-Drug-Related HIV Diagnoses — United States, 1994 – 2000.

Background: Over the 20-year history of the HIV/AIDS epidemic, injection drug use (IDU) has been a risk factor for contracting the disease. IDU- related HIV cases include injection drug users and their sex partners.
Methods: We analyzed IDU-related HIV (not AIDS) diagnoses by year from 1994 to 2000 using national HIV surveillance data, adjusted for delays in reporting cases and risk information from 25 HIV-reporting states, accounting for 24% of the epidemic in this period.
Results: New IDU-related HIV diagnoses declined 43% from 4226 cases in 1994 to 2403 cases in 1999 followed by a 5% increase in 2000 to 2514. Though declines were similar in all demographic groups, males and blacks continue to make up disproportionate numbers of new IDU-related HIV cases diagnosed in 1994-2000, 66% and 65%, respectively. Among men IDU-related HIV diagnoses declined 44%, from 2819 cases in 1994 to 1568 cases in 1999 and increased by 4% to 1628 in 2000. Black men made up 64% of new cases from 1994-2000. Among women, IDU-related HIV diagnoses declined 40% from 1407 cases in 1994 to 835 cases in 1999 and increased by 6% to 886 in 2000. Declines were similar for black and white women from 1994 to 1999, down by 42% (968 to 553) and 38% (327 to 222), respectively. The largest increase of IDU-related HIV infected females from 1999-2000 occurred among white women (10%), though black women outnumber white females 3 to 1.
Conclusions: Increases in IDU-related HIV diagnoses since 1999 may reflect increases in testing or new infections. Drug treatment for injection drug users, and initiatives to prevent initiation of injection drug use should be enhanced to prevent viral transmission.

Key words: **i**njection drug use, AIDS

Tuesday Morning — April 23, 2002

8:30 Vaccine-Preventable Diseases. Moderator: Larry Pickering

8:35 *Weigong Zhou, M. Muetsch, P. Rhodes, R. Steffen, R. Chen*
Bell's Palsy After A New Intranasal Influenza Vaccine — Switzerland, 2000 – 2001.

Background: Intranasal vaccinations are less painful and better tolerated than injections and may enhance coverage. A new inactivated virosomal intranasal influenza vaccine (*Nasalflu*) was introduced in Switzerland in October 2000. During the ensuing six months, 46 *Nasalflu* vaccinees who developed Bell's palsy were reported to Swiss authorities. We conducted a case-control study to evaluate this possible association.
Methods: A mail survey was conducted among Swiss physicians for incident patients of Bell's palsy occurring from 10/1/2000 to 4/30/2001. Each identified case was then matched to up to 3 controls in the same physician=s office by date of the visit and age. Information on exposure to either *Nasalflu* or traditional injectable influenza vaccines in the study period was collected. The data were analyzed using logistic regression.
Results: The survey ascertained a total of 1259 incident Bell's palsy patients. Data for 92 patients and 232 controls were available for interim analysis. Twenty-four (26.1%) of the 92 patients versus two (0.9%) of the 232 controls had received the *Nasalflu* vaccine (P<0.01). Patients with Bell's palsy were significantly more likely to have received the *Nasalflu* vaccine than controls (Odds Ratio [OR]=41.1, 95% Confidence Interval [CI]=9.4 -179.5). In contrast, 14 (15.2%) of the 92 patients and 45 (19.4%) of the 232 controls had received the injectable influenza vaccine (OR=1.1; 95% CI=0.5 -2.1).
Conclusions: Our data support a possible causal relation between Bell's palsy and *Nasalflu* vaccination, but not with the injectable influenza vaccination. If final results of the case-control study also demonstrate this newly identified risk of intranasal vaccinations, this apparent setback may permit insights into the pathogenesis of the adverse event and ultimately aid the development of a safer vaccine.

Key words: influenza, vaccine safety, vaccination, Bell's palsy

8:55 *Temeika L. Fairley, A. Mokdad, R. Jiles, E. Maurice*
Is Vaccination Coverage Related to the Number of Immunization Providers? Findings from the National Immunization Survey — United States, 2000.

Background: Maintenance of high vaccination coverage levels (≥90%) is the best way to prevent the spread of vaccine preventable diseases. However, national vaccination coverage with the 4:3:1:3 series (four or more doses of diphtheria and tetanus toxoids and pertussis vaccine, three or more doses of poliovirus vaccine, one or more dose of measles, mumps, and rubella vaccine, and three or more doses of *Haemophilus influenzae* type b vaccine) among children ages 19-35 months was 76.2% for 2000. It is hypothesized that low vaccination coverage is due to incomplete ascertainment of vaccination status among children who have more than one provider (17.9%).
Methods: Children from the 2000 National Immunization Survey were classified into three groups based on the number of providers who reported vaccination histories: one, two, or three or more providers. These groups were compared based on socio-demographic characteristics and 4:3:1:3 coverage.
Results: Children with three or more reporting providers were more likely than those with 1 or 2 providers to have moved since their birth and to have ever received benefits through the Women, Infants, and Children Program. Among children with one (n=18,848), two (n=3,709), or three or more (n-401) reporting providers, the vaccination rates were 75.5%, 78.7%, and 87.5% (p<0.0005), respectively.
Conclusions: Contrary to expectations, children with three or more reporting providers had higher 4:3:1:3 coverage than those with 1 or 2 reporting providers. This finding suggests that more frequent assessment of vaccination status and provision of needed vaccines may be associated with use of multiple providers.

Key words: child, immunization, vaccination coverage, provider

9:15 ***Chima J. Ohuabunwo, B. Cadwell, K. Bisgard, C. Vitek, A. Baughman***
Pertussis Hospitalizations in the United States, 1992–1996: Capture-Recapture Evaluation of the Completeness of National Reporting.

Background: From 1980-2000, the reported incidence of pertussis in the US increased >3-fold from 0.75 to 2.85 per 100,000. Some evidence suggests substantial underestimation of the pertussis burden. Effective disease control requires more accurate data on the true burden of disease.
Methods: We compared 1992-1996 pertussis hospitalization data from two independent surveillance systems: National Notifiable Disease Surveillance System (NNDSS) and Health Care Information Association (HCIA). Because no common unique identifier existed, data were grouped according to year and state of hospitalization, sex, and month and year of birth. For each group, capture-recapture estimates of the number of hospitalizations were derived by the Chapman-modified Lincoln-Peterson method and weighted. The estimated total number of hospitalizations was obtained by summing the weighted estimates of all groups. Completeness of reporting was calculated as the number of pertussis hospitalizations captured by each system divided by the estimated total number of pertussis hospitalizations.
Results: Most reported pertussis hospitalizations occurred among persons aged <1 year and 1-4 years (82% and 12% for NNDSS; 88% and 9% for HCIA, respectively). Length of hospitalization and case fatality rate were higher among cases reported to NNDSS than to HCIA. For 1992-1996, we estimated that 11095 pertussis hospitalizations occurred (Bootstrap 95% CI = 10599-11633), over 80% higher than the number reported to NNDSS (6,164) or HCIA (5,943). Completeness of reporting to NNDSS was 56% and to HCIA was 54%.
Conclusions: Pertussis hospitalizations are highly underreported in the United States, indicating a much higher disease burden than portrayed by the NNDSS. Enhanced surveillance is critical to better assess pertussis national health impact and existing control strategies.

Key words: pertussis, capture-recapture, hospitalization, surveillance

9:35 ***Gustavo H. Dayan, L. Zimmerman, L. Shteinke, K. Kasymbekova, A. Uzicanin, S. Reef, P. Strebel***
Outbreak of Rubella — Bishkek City and Chui Oblast, Kyrgyzstan, 2001.

Background: Rubella, usually a mild febrile rash illness, may cause miscarriage, fetal deaths, and the congenital rubella syndrome (CRS) when acquired during early pregnancy. Throughout the former Soviet Union, rubella epidemiology and the risk of CRS have not been well documented. In 2001, Kyrgyzstan did not have surveillance for CRS or a national rubella vaccination program, but was planning to implement both in 2002. However, a rubella outbreak occurred in early 2001. We investigated the outbreak to describe the pre-vaccination epidemiology of rubella and assist in developing control activities.
Methods: Physicians report clinically diagnosed rubella cases to the District Sanitary-Epidemiologic Stations (D/SES); DSES forward monthly aggregate reports to the national SES. We analyzed the available rubella surveillance and laboratory data obtained during January 2000 - August 2001.
Results: From January through August 2001, 1,951 cases were reported nationwide, for an overall incidence rate per 100,000 population (IR) of 40, compared with 3.6 during the corresponding time period in 2000. Most cases were reported from Bishkek city (n=1,488) and Chui Oblast (n=448); of these, 243 were tested and 176 (72%) laboratory confirmed. Persons aged 0-14 years represented 88% of the reported cases. The IR among persons aged 0-14 years increased from 25.6 in 2000 to 454.5 in 2001, and among those aged 15-35 years from 1.2 in 2000 to 41.4 in 2001.
Conclusions: Even though most rubella cases occurred among children aged <15 years, risk of rubella infection for persons of childbearing age increased 40 times during the 2001 outbreak compared with 2000. Our findings support Kyrgyzstan´s plan to introduce a comprehensive rubella/CRS prevention program, including routine childhood vaccination and vaccination of women of childbearing age.

Key words: rubella, outbreak, Kyrgyzstan, vaccination

10:30 Infant and Child Health: Intervention and Prevention. Moderator: José F. Cordero

10:35 *Kelly L. Moore, M. Kainer, N. Badrawi, S. Afifi, M. Wasfy, M. Bashir, D. Jernigan, F. Mahoney*

Early-Onset Sepsis Among Neonatal Intensive Care Unit Patients — Cairo, Egypt, 2001.

Background: Gram-negative sepsis is an important cause of mortality among hospitalized neonates in resource-limited countries. Infections caused by antimicrobial- resistant pathogens increase costs, morbidity, and mortality. Reported mortality rates of 50% in neonatal intensive care unit (NICU-A) patients in Cairo, Egypt, associated with bloodstream infections (BSIs) with resistant gram-negative organisms prompted an investigation.
Methods: A case was defined as sepsis determined by physician diagnosis or positive blood culture in a NICU-A infant. To establish mortality, clinical sepsis, and BSI rates, we performed a retrospective cohort study of all NICU-A admissions between May 3 and July 31, 2001. Observational studies of routine practices guided environmental sampling. In-use intravenous (IV) fluids and medications were cultured at U.S. Naval Medical Research Unit No. 3 (NAMRU-3).
Results: The overall mortality rate was 59/115 (51%); clinical sepsis rate was 88/115 (77%). Twenty-one (64%) of 33 neonates with BSIs were bacteremic ≤24 hours of birth. *Klebsiella pneumoniae* accounted for 24/33 (73%) BSI isolates; 14/24 (58%) were extended-spectrum beta-lactamase producing, aminoglycoside-resistant (ESBL-AR-KP). All neonates received dextrose-containing IV fluids on admission; because of limited supplies, IV bottles (500 ml) were divided among multiple infants. IV fluids were prepared at the bedside; poor adherence to hand hygiene recommendations and aseptic techniques was observed. ESBL-AR-KP was isolated from 13/18 (72%) dextrose-containing in-use IV fluids. The September-October 2001 clinical sepsis rate of 45/90 (50%) (RR post-intervention (PI) =0.65 [95%CI=0.52-0.82, p<0.001]) and mortality rate of 30/92 (33%) (RR PI=0.64 [95% CI=0.45-0.90, p=0.007]) reflected improvement of IV fluid preparation techniques.
Conclusions: Contaminated IV fluids resulted in early-onset sepsis and deaths. Adherence to basic infection control practices and provision of adequate supplies improved mortality and sepsis rates.

Key words: sepsis, newborn, nosocomial infection, infection control, Egypt

10:55 *I. Chuang, R. Lynfield, P. Ferrieri, J Elliott, A. Schuchat, ABCS Team*

New Look at Late-Onset Group B Streptococcal Disease in the Era of Intrapartum Antibiotic Prophylaxis.

Background: Since issuance of guidelines for prevention of perinatal group B streptococcal (GBS) disease in 1996, the incidence of early-onset (EO) GBS disease has declined, but late-onset (LO) disease incidence remains unchanged (annual incidence 0.34-0.39 per 1000-live-births). Because GBS is a leading and potentially vaccine-preventable cause of neonatal meningitis, most of which are LO, we characterized LO GBS disease detected by a multistate surveillance in the U.S.
Methods: Active, population/laboratory-based surveillance was conducted in 8 areas (population of 26 million) through Active Bacterial Core surveillance from 1990-1999. LO disease was defined by isolation of GBS from a sterile site from infants age 7-89 days; EO disease occurred at age 0-6 days.
Results: We identified 993 LO and 2954 EO GBS cases. Blacks were more common among LO cases (55%) compared with EO cases (41%, p <0.0001) and the birth cohort (22.7% for 1997, p <0.0001). Prematurity was more common among infants with LO GBS than in U.S. birth cohort (37% vs. 10.8%, p<0.0001). Meningitis occurred in 28% of LO vs. 4.7% of EO cases (p <0.0001). Among 192 LO cases with serotype data, types III (56%), Ia/c (14%), and V (13%) predominated, all represented by the vaccine-in-development. The case-fatality ratios for LO and EO disease were similar (3.8 vs. 4%, respectively).
Conclusion: LO GBS continues to cause substantial morbidity and mortality, particularly among black and premature infants. Meningitis accounts for nearly one-third and serotype III causes more than half of all cases. A multivalent conjugate vaccine under development administered to women holds potential for passive infant protection against late-onset disease, in addition to early-onset.

Key words: Group B streptococcal disease, late-onset group B streptococcal diseases, meningitis

11:15 ***Janet H. Bates, B. Woodruff, M. Serdula, R. Kaufmann, L. Kettel Khan, N. Bolormaa, B. Byambatogtoch, D. Erjen***

Nutritional Status of Children After Severe Winter Weather — Mongolia, 2001.

Background: During 1999-2001, Mongolia had two exceptionally harsh winters ("dzud") that caused massive livestock losses and threatened the health and food security of nearly 500,000 rural Mongolians. Young children in districts severely affected by dzud conditions were at particular risk for acute malnutrition. Therefore, we assessed the nutritional effects of the dzud on young Mongolian children in order to target intervention and relief efforts.

Methods: In June 2001, we collected data on dietary intake, anthropometric measurements, and hemoglobin concentration from children aged 6-59 months in two samples: 474 children in districts with heavy livestock losses (dzud-affected) and 463 children in unaffected districts. We used a three-stage cluster design to select samples. A weight-for-height z-score of <-2.0 defined wasting (acute malnutrition) and a height-for-age z-score of <-2.0 defined stunting (chronic malnutrition). Anemia was defined as hemoglobin concentration of <11.0 g/dL. We used SUDAAN 7.5 for analysis.

Results: In both samples, >90% of infants were breastfeeding; children's diets consisted primarily of meat, unfortified flour, and dairy products, with rare fruit or vegetable consumption; and wasting was rare (<1%). However, stunting was found in 35.7% of children in dzud-affected districts (95% confidence interval [CI]=30.7-40.7) and 30.3% of children in unaffected districts (95% CI=24.8-35.8). Anemia was common among children aged 6-23 months in both samples: 46.6% (95% CI=38.0-55.1) and 52.2% (95% CI=43.7-60.7).

Conclusions: Although we found no excess wasting among children in dzud-affected districts compared with unaffected districts, stunting and anemia were common in both samples. Micronutrient-rich or fortified foods that could prevent these conditions are largely absent from children's diets. Interventions should include expansion of current growth monitoring and iron supplementation programs and fortification of foods with iron.

Key words: malnutrition, anemia, Mongolia, anthropometry, nutrition surveys, child nutrition

11:35 ***Catherine Staunton, S. Davidson, K. Powell, S. Kegler, L. Dawson, T. Gill, M. Washington, A. Dellinger***

Critical Gaps in Child Occupant Safety, Surveillance and Legislation — Georgia, 2001.

Background: Motor vehicle crashes are the leading cause of death among children in the United States. Child occupant restraint use and seating children in the back seat are effective injury prevention strategies. However, many children ≤12 years of age ride inappropriately restrained and seated in the front seat. In most states, surveillance of and laws governing child occupant safety do not meet recommended safety guidelines.

Methods: We studied a convenient sample to document occupant restraint use and seating position in children 0-12 years in Georgia. In May 2001, police officers at 87 roadblocks in 24 counties documented age, restraint use and seating position for 1858 children. We compared these results with current state law and existing surveillance data.

Results: Only 42% of children were in appropriate restraint systems and in the back seat. Restraint-related problems included: 1) Infants in forward facing child safety seats (28%), and/or positioned in the front seat (24%); 2) 4-8 year olds who were unrestrained (4%) or in car seat belts alone (75%), rather than in booster seats; and 3) 9-12 year olds in the front seat (40%). Only 16% of children in our study would have been identified by current surveillance as inappropriately restrained and/or positioned. Current Georgia state law addresses only 38% of the inappropriate restraint users in our study population. The remaining 62% were restrained legally albeit not correctly. State law does not address seating position at all.

Conclusions: The majority of child occupants in this Georgia study were not appropriately restrained. These results support the need for improved surveillance to identify risk groups and for stronger legislation to address gaps in state child occupant safety law.

Key words: child occupant restraint; seating position, booster seats, surveillance, legislation

Monday–Tuesday Poster Session

12:15 Poster Session No. 1 — Posters on Display

(See Monday schedule for list of presentations)

Tuesday Afternoon — April 23, 2002

1:25 Mackel Award Finalists. Moderator: M. Patricia Quinlisk

1:35 ***Jay K. Varma, M. Reller, S. DeLong, J. Trottier, S. Nowicki, M. DiOrio, E. Koch, K. Greene, T. Bannerman, S. York, J. Wells, P. Mead***
Dances with Cows? Large Outbreak of *Escherischia coli* O157 Infections at a Multi-Use Community Facility — Lorain County, Ohio, September 2001.

Background: Infection with *Escherichia coli* O157 causes over 70,000 illnesses in the United States annually and can result in hemolytic-uremic syndrome (HUS) and death. In September 2001, Ohio health officials identified an outbreak of *E. coli* O157 infections among Lorain County fair attendees.
Methods: To identify the source of the outbreak, we conducted a case-control study and environmental investigation. We defined a case as laboratory-confirmed *E. coli* O157 infection, HUS, or bloody diarrhea in a fair attendee occurring within seven days of the fair. Controls were well, age-matched fair attendees. *E. coli* O157 isolates were subtyped using pulsed-field gel electrophoresis (PFGE).
Results: We enrolled 23 patients and 53 controls. The median age of patients was 15 years; 43% were female. Patients were more likely than controls to have visited a specific show barn (matched odds ratio [mOR]=7.8, 95% confidence interval [CI]=2.0-30.2). Among barn visitors, illness was independently associated with attending a dance (mOR=7.5, 95% CI=1.4-41.2), eating or drinking in the barn (mOR=4.5, 95% CI=1.2-16.6), or handling sawdust from the barn floor (mOR=4.6, 95% CI=1.1-20.0). *E. coli* O157 isolates with indistinguishable PFGE patterns were recovered from nine patients and from the barn's sawdust, bleachers, handrails, walls, and rafters.
Conclusions: Unlike previous outbreaks linked to food, water, or direct animal contact, this outbreak was associated with widespread contamination of a building. Recovery of *E. coli* O157 from the rafters suggests that aerosolization of the organism during the dance or other dusty events contributed to the contamination. Guidelines are needed for decontaminating multi-use facilities that intermittently house cattle. Replacing sawdust, a ground cover found in barns throughout the U.S., may be necessary to prevent future outbreaks.

Key words: *Escherichia coli O157,* disease outbreaks, environmental microbiology, electrophoresis, gel, pulsed-field

1:55 ***Julia C. Rhodes, H. Baggett, S. Fridkin, A. Adija, C. Quinn, J. Hageman, C. Friedman, J. Jernigan, The Washington DC Anthrax Serology Team***
Serologic Testing of Symptomatic Patients Exposed to Anthrax — Washington, DC, October, 2001.

Background: In response to *Bacillus anthracis* spore contamination and patients diagnosed with inhalational anthrax, Public Health authorities recommended post-exposure prophylactic antibiotics (PEP) for thousands of exposed persons working in potentially contaminated areas in Washington, D.C. In the following weeks, patients taking PEP presented to area hospitals with "flu-like" symptoms. Although these

patients did not have classic inhalational anthrax, area physicians questioned whether they might have a milder form of disease, in which PEP reduced both symptom severity and the reliability of traditional diagnostic tests (e.g. blood cultures). To address this question, CDC performed serologic testing of exposed, symptomatic patients taking PEP to describe their disease spectrum.

Methods: Local physicians and health departments contacted CDC about patients for whom traditional diagnostics could neither confirm nor exclude anthrax. Clinical and exposure data were collected from health care providers. Serologic testing used a 98.6% sensitive enzyme-linked immunosorbant assay (ELISA) that detects immunoglobulin (Ig) G response to *B. anthracis* protective antigen (PA). Specificity to PA was confirmed using competitive inhibition assay for samples >10.0 μg/mL on ELISA.

Results: Of 139 patients clinically evaluated, 105 (76%) had serum available: 53 paired samples, 34 acute only, and 18 convalescent only. At presentation these 105 patients were symptomatic a median of 2.5 days; 55% had fever or chills, 62% cough, 44% malaise or fatigue, 26% dyspnea, and 15% had chest x-ray abnormalities. Only six patients (6%) had detectable antibody levels and inhibition assays on their sera indicated non-specific reaction. No paired sera demonstrated a significant antibody rise.

Conclusions: Serologic testing of exposed, symptomatic patients found no evidence to support the existence of a mild form of inhalational anthrax among persons on PEP.

Key words: anthrax, serologic tests, antibody formation, signs and symptoms

2:15 ***Amita Gupta, C. Crowe, J. Fontana, A. Stout, B. Bolstorff, M. McGuill, B. Matyas, S. Montgomery, Natasha Pugsley, B. Johnson, S. Schoenfeld, F. Angulo***

Cows, Bugs, and Drugs: Investigation of Sporadic Illnesses Caused by Multidrug-Resistant *Salmonella Newport* — Massachusetts and Vermont, 1998 – 2001.

Background: *Salmonella* causes approximately 1.4 million illnesses and 600 deaths annually in the United States. We describe the emergence of multidrug-resistant (MDR) *Salmonella* Newport in Massachusetts and Vermont in 2001.

Methods: All *S.* Newport isolates received between July 1998 and March 2001 were characterized by antimicrobial-susceptibility testing and pulsed-field gel electrophoresis (PFGE) at Massachusetts Department of Public Health. Isolates were defined as MDR if they were resistant to ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, tetracycline, extended-spectrum cephalosporins, and ampicillin/clavulanic acid. In March 2001, a case-control study was performed comparing 34 persons with MDR *S.* Newport (case-patients) to 37 persons with antimicrobial-susceptible *S.* Newport (ill controls) and 94 randomly-selected well controls.

Results: In 1998, no MDR *S.* Newport isolates were identified. From January 1999-March 2001, 120 human *S.* Newport isolates were identified; 46 (38%) were MDR and 71 (59%) were antimicrobial-susceptible. From January 2000-March 2001, 17 bovine *S.* Newport isolates were identified in Massachusetts and Vermont; all were MDR. One PFGE pattern accounted for 57% of human and 64% of bovine MDR isolates. The median age of case-patients was 23 years, 63% were female, and 34% were hospitalized. In the seven days before illness onset, case-patients were more likely than ill controls to report bloody diarrhea (52% vs.18%, OR 4.7, 95% CI 1.4-17.9), have exposure to farms (21% vs. 3%, OR 9.1, 95% CI 1.1-432), and have no international travel history (0% vs.11%, OR undefined). Case-patients were more likely than well controls to have exposure to farms (22% vs. 3%, OR 16.7, 95% CI 2.0-768.8).

Conclusions: MDR *S.* Newport has emerged in the northeastern United States. Cattle are a reservoir and direct farm exposure is a risk factor for human illness.

Key words: *Salmonella*, antimicrobial resistance, human, cattle

2:35 ***Marion A. Kainer, H. Keshavarz, B. Jensen, M. Arduino, M. Brandt, A. Padhye, L. Archibald***

Surgery, Air, Water Damage, and *Curvularia:* Is Being Curvaceous Worth the Price? — Alabama, 2001.

Background: From 1992–2000, in the United States, the frequency of cosmetic breast augmentation (CBA) surgery increased 476%; >95% of CBA surgery involved saline-filled breast implants (SALBI). From December 2000 through July 2001, five women who underwent CBA revisions and removal of

SALBI had *Curvularia* spp. (a black fungus) infections; initial implant surgery was performed at one surgicenter (Center A). No previous SALBI or *Curvularia* spp. infection outbreaks have been reported.
Methods: To identify case-patients and determine the background rate, we defined a case-augmentee as any woman who underwent CBA at Center A between January 2000 and June 2001 and had black sediment detected in her SALBI. To identify risk factors for *Curvularia* spp. infection, we performed a retrospective cohort study of women who had CBA with SALBI during May–September 2000. We conducted procedure and facility reviews and epidemiologically directed microbiologic studies.
Results: Five case-augmentees were identified. Risk of infection was associated with having CBA in operating room 2 [OR2] (4/88 vs 1/140, Relative Risk=6.6, 95% Confidence Interval=0.73-60.2, p=0.07) and duration of surgery ($p<0.001$). Saline bottles stored in the sterile supply room under a water-damaged ceiling were placed in a warming cabinet opposite OR2. OR2 was maintained at negative pressure to the corridor. Before SALBI injection, saline was poured into open bowls in the OR and exposed to OR air. *Curvularia lunata* was isolated from sterile supply room air.
Conclusion: Centers that carry out CBA procedures and surgicenter personnel should enforce appropriate infection control and environmental precautions, such as moisture control and positive-pressure ORs. In addition, saline should not be open to air prior to SALBI injection.

Key words: breast implants, fungi, disease outbreaks, surgicenters, ventilation, maintenance and engineering, hospital, hospital design and construction

3:15 Public Health Surveillance. Moderator: Daniel M. Sosin

3:20 *Christina G. Tan, H. Sandhu, D. Crawford, L. Hathcock, P. Eggers, K. Nalluswami, E. Chernak, E. Farnon, C. Schaben, P. Sassano, E. Bresnitz, the CDC New Jersey Anthrax Surveillance Team**

Surveillance for Anthrax Cases Associated with Intentional *Bacillus anthracis* Release — New Jersey, Delaware, and Pennsylvania, October – December 2001.

Background: Surveillance for anthrax cases related to intentional *Bacillus anthracis* release is critical for timely implementation of treatment and control measures. During October 2001, two inhalational (IA) and four cutaneous anthrax cases resulting from anthrax-contaminated letters passing through a mail processing facility were identified in New Jersey. Following facility closure on October 18, active surveillance for IA was initiated.
Methods: Active surveillance was initiated October 24 in 61 hospitals in New Jersey, Pennsylvania, and Delaware. Infection control practitioners (ICPs) provided daily totals of emergency department (ED) and intensive care unit (ICU) admissions. Through November 7, ICPs reported patients meeting criteria for possible IA: any ICU patient who had microbiologic testing performed or any ED patient with respiratory failure/distress. On November 8, ICP reporting criteria were narrowed to include only ICU or ED patients with sepsis or febrile respiratory illness of unknown origin. We followed up on reported patients without clear alternative diagnoses.
Results: During October 24-December 17, 240,546 ED visits and 7,121 ICU admissions were reported in a surveillance area of 6.7 million residents. Initially a daily average of 18 patients met reporting criteria for possible IA; 106 (36%) of 291 reports required follow-up. After reporting modifications, a daily average of three patients were reported; 47 (43%) of 109 reports required follow-up. Average daily reports decreased 83% but the proportion of reports followed up increased 18%. Sixty-one (40%) of 153 patients requiring follow-up were tested for *B. anthracis*. No new cases were identified.
Conclusions: Surveillance was important to verify the outbreak's limited scope but was labor-intensivea and difficult to sustain without additional resources. System flexibility allowed for interim evaluation toimprove surveillance efficiency.

Key words: anthrax, bioterrorism, surveillance

*The CDC New Jersey Anthrax Surveillance Team:
C. Alozie-Arole, G. Armstrong, M.J. Beach, B. Bell, J. Buehler, S. Chamany, D.R. Croft, C. Crowe, M. Dott, A. Fiore, D. S. Friedman, J. Gardom, S. Goldstein, C. Greene, B.C. Imhoff, M. Kennedy, M. McConnell, P.D. McElroy, C. Pecoraro, R.W. Pinner, S. Redd, L. Roth, N. Tucker

3:40 ***Mei L. Castor, C. Whitney, R. Facklam, P. Cieslak, M. Farley, N. Bennett, S. Lewis, S. Johnson, P. Ferrieri, K. Como-Sabetti, R. Lynfield***

Antimicrobial Susceptibility and Serotype Patterns of Invasive Group B *Streptococcus* Isolates — Georgia, Minnesota, New York, and Oregon, 1996 – 2000.

Background: Maternal carriage of group B *Streptococcus* (GBS) poses a risk for vertical transmission to neonates. Intrapartum GBS chemoprophylaxis recommendations implemented in the 1990s reduced invasive early-onset neonatal disease by 65% (1.7 to 0.6 per 1,000 livebirths during 1993-1998). Nonetheless, GBS remains the leading cause of neonatal invasive disease and is an important pathogen for peripartum women and nonpregnant adults. Identifying susceptibility and serotype trends is critical for guiding chemoprophylaxis recommendations and vaccine formulation.

Methods: Active population-based surveillance for GBS was conducted in four states during 1996-2000. Case-patients were defined by GBS isolation from a sterile site; analyses were performed on perinatal (neonates and pregnant women) and nonpregnant adult case-patients. Isolates were tested for susceptibility by broth microdilution and serotyped.

Preliminary Results: Of 3,399 case-patients, 1,043 (31%) had susceptibility data and 1,638 (48%) had serotype data. No isolates were resistant to penicillin, vancomycin, cephalothin, or cefazolin. Clindamycin resistance was found in 110 (11%) and erythromycin resistance in 196 (19%) isolates. During 1996-2000, erythromycin resistance increased from 16% to 22% (X^2 for trend 5.2, p=0.02). Perinatal isolates were commonly serotypes III (40%), Ia or Ia/c (27%), and V (17%). Nonpregnant adult isolates were most often serotype V (30%). Serotype V was associated with clindamycin or erythromycin resistance among perinatal (X^2 p<0.001 for both) and nonpregnant adult isolates (clindamycin, X^2 p=0.009; erythromycin, X^2 p=0.02).

Conclusions: Clindamycin and erythromycin are considered alternatives to penicillin for intrapartum prophylaxis in penicillin-allergic women; however, resistance to both was found. Cefazolin or vancomycin might be preferable alternative agents. Clindamycin and erythromycin resistance was associated with serotype V. Vaccine strategies should consider predominant serotypes and/or serotypes associated with resistance.

Key Words: *Streptococcal* infections, *Streptococcus agalactiae*, *Streptococcus* group B, microbial antibiotic resistance.

4:00 ***Rebecca L. Winston, L. Paulozzi***

Spuriously High Injury Death Rates among Hispanics — North Carolina, 1998.

Background: Because eliminating health disparities in minorities is a Healthy People 2010 priority, the public health community is paying increasing attention to the Hispanic population, a rapidly growing minority group. Recent comparison of state unintentional injury (UI) death rates among US Hispanics using WISQARS, a web-based injury statistics query system, reported that North Carolina ranked first, with a rate 40% higher than the second-ranked state, New Mexico. We examined the numbers to confirm this rate.

Methods: Focusing on denominators used to compute the rates, we compared post-1990 Census Bureau population estimates to 2000 Census counts for Hispanics in North Carolina and in all 17 other states with substantial Hispanic populations. We calculated revised 1998 estimates using a linear interpolation between the 1990 and 2000 Census counts. We compared rates derived from the revised population estimates to previously reported rates.

Results: Post-censal estimates from 1990-99 showed steady growth of about 10% per year in North Carolina's Hispanic population. However, 1999's post-censal estimate was only 46% of the 2000 Census count, suggesting substantial underestimation of the North Carolina Hispanic population's growth in the 1990's. The revised estimate for 1998 North Carolina Hispanics was 318,516, 97% greater than the original 161,870. After recalculation, the North Carolina Hispanic UI death rate decreased 49% from 79 to 40 per 100,000, placing it just below New Mexico. Recalculated rates decreased as much as 40% in other states and did not increase in any state.

Conclusions: Post-censal population estimates for rapidly increasing minority populations may hold large errors. Health indicator rates in such populations should therefore be viewed with caution, especially later in the decade when census estimates may be most inaccurate.

Key words: Hispanics, injury, mortality, population, bias

4:20 ***Regina L. Tan, K. Powell, K. Lindemer, M. Clay, S. Davidson***

Capture-Recapture Assessment of Dog Bite Incidence Among Children — Chatham County, Georgia, 2000.

Background: An estimated 4.5 million persons receive dog bites each year, and 80% of fatalities occur among children under 10. In 1999, three children in Chatham County, Georgia were seriously injured by dog bites, one fatally. Although several agencies collect reports, no central reporting system exists for dog bites. We assessed the incidence of dog bites to Chatham County children in 2000.
Methods: We investigated dog bites occurring in 2000 to persons aged ≤ 18 years. A case was defined as a reported dog bite or unwanted contact from a dog's mouth. We identified seven potential sources of dog-bite-event report records: the county health department, two county police departments, state notifiable disease, statewide hospital discharge, statewide emergency medical service, and statewide vital statistics. Data were abstracted and double-entered using EpiInfo 6.04b. Records were matched using victim name, age, sex, and incident date, and capture-recapture methods were used to estimate true incidence. Population data were obtained from Census 2000.
Results: Of seven sources, only the health department and one police department had childhood dog bite reports in 2000. A total of 103 dog bites were reported, with 83 and 39 reported to the health and police departments, respectively. Nineteen were reported to both systems. Based on capture-recapture analysis, an estimated 67 bites were unreported. During 2000, 1.7 dog bites per 1000 children were reported to the two systems, but the true incidence is estimated to be 2.8 per 1000.
Conclusions: In 2000, an estimated 170 dog bites were received by Chatham County. A cooperative reporting system from county health and police departments is recommended for effective baseline incidence estimates for the evaluation of community interventions.

Key words: dogs, bites, incidence, surveillance

4:40 ***Gérard Krause, H. Claus, T. Breuer, W. Hellenbrand, D. Altmann, A. Ammon, O. Hamouda, M. Kramer***

New National Surveillance System for Notifiable Diseases: Evaluation After the First Year of Implementation — Germany, 2001.

Background: In 2001 a new, case definition based, national surveillance system for notifiable diseases was implemented in Germany. Local health departments (HDs) used one of 6 software programs (1 public domain, 5 commercial) for processing and transmission of case-reports via state health departments to the National Public Health Institute (RKI). The system was evaluated to implement continuous quality improvement and to assess its possible contribution to a future European surveillance system.
Methods: We evaluated data quality through consistency checks, measured timeliness as transmission time from receipt of case-report at HDs until arrival at the RKI, and assessed representativeness and acceptability through reporting incidence of HDs and number of reporting HDs. We evaluated simplicity, flexibility and stability by system analysis and focus-group discussions with HD staff. Usefulness was assessed by the ability to detect outbreaks.
Results: Within 5 weeks after implementation of the system the RKI received reports from 441 (98%) of 451 HDs. In 2001, a total of 265,740 cases were reported, 229,693 (86%) of these cases passed automated consistency checks. More detailed consistency checks were passed by 3128 (85%) of 3682 manually checked reports. The median transmission time was 7 days. Overall incidence differed between East German (456 reports/100.000 inhabitants) and West German states (276/100.000). Data quality, flexibility, simplicity, and stability was best among HDs using the public domain software. In 2001, 738 outbreaks with more than 5 cases were reported.
Conclusions: The new system has been successfully implemented and its public domain software may serve as a tool for a European surveillance system. Further improvement will be addressed by training at HDs, software modifications, and further development of the quality management system.

Key words: surveillance, electronic reporting, Germany, evaluation, notifiable diseases

Tuesday Evening — April 23, 2002

Special Session — International Night
Sponsored by the Training in Epidemiology and Public Health Interventions Network (TEPHINET)

7:00 International Health: Information and Action. Moderator: Philip S. Brachman

P1. ***Lenildo de Moura,[1] M.. Wada,[1] E. Carmo,[1] R. Dusi,[1] Suely H. Tuboi,[1] N. Camargo,[2] R. Trevisan,[2] R. Graça,[3] C. Silveira,[4,5] R. Belfort,[4] A.. Mazzotini,[6] C. Felipe,[6] E. Almeida,[7] L. Oliveira,[7] D. Garrett,[8]***

Epidemic of Toxoplasmosis Associated with Ingestion of Contaminated Municipal Water — Brazil.

Background: In January, 2002, 600 residents of a small city in Brazil presented symptoms consistent with toxoplasmosis. Over 300 had serologic evidence of acute infection with *T. gondii*.
Methods: In a matched case-control study, an acute case was defined as any resident with symptoms, IgM, and IgG antibodies from November, 2001, to January, 2002. Controls matched by age group and sex were selected from a list of antibody-negative volunteers.
Results: Of 197 people meeting the case definition, 156(79%) participated in the study; 79(51%) were male with a median age of 28(range=1-72) years. Mapping showed a clustering of cases in the downtown area served by one of two water plants (reservoir A). At multivariate analysis, risk factors were receiving water from reservoir A (matched Odds Ratio [mOR]=4.68;95% Confidence Interval[95%CI]=1.7-12.6;p-value=0.002) and having a household water storage tank (mOR=2.07;95%CI=1.13-3.80;p-value=0.01). These tanks may have favored sporulation and infectivity of oocysts. Of 7 pregnant case-patients, 1 had a miscarriage and 5 delivered infants with positive IgM and IgG. Ocular toxoplasmosis was seen in 8% of the patients. A domestic cat was known to have lived and delivered kittens on top of the implicated reservoir. Serology of one kitten available for testing was positive for IgG. The water of reservoir A was not filtered. A large-volume water sampling method to detect the parasite was positive.
Conclusions: We report the word's largest outbreak of water-related toxoplasmosis. Also, this is the first time that *T. gondii* is isolated from implicated water. Our investigation shows the vulnerability of municipal water systems to contamination with toxoplasma and highlights the public health importance of drinking water as a vehicle for transmission of toxoplasmosis.

Key words: toxoplasma gondii infection, toxoplasma gondii, toxoplasmosis and outbreak.

[1]National Center of Epidemiology (Centro Nacional de Epidemiologia), National Foundation of Health (Fundação Nacional de Saúde), Ministry of Health, Brazil.
[2] State Secretary of Health, Paraná, Brazil.
[3] Laboratório Central de Saúde Pública, Paraná, Brazil.
[4] Escola Paulista de Medicina,São Paulo,Brazil.
[5] Clínica Silveira, Erechim, Rio grande do Sul, Brazil.
[6] Municipal Secretary of Health, Santa Isabel do Ivaí, Paraná,Brazil.
[7] Universidade Estadual do Norte Fluminense, Rio de Janeiro.
[8] Brazilian Field Epidemiology Training Program, CDC and the CDC Foundation, Atlanta, GA.

P2. ***Agnes Benegas,[1] J. Navarro,[1] M. Roces,[1] J. Lopez,[1] M. Lim-Quizon[1]***

Detection and Response to the Presence of Circulating Vaccine-Derived Poliovirus — Philippines, 2001.

Background: The last poliomyelitis case in the Philippines occurred in March 1993; the country was certified polio-free in October 2000. However, during March–July 2001, three cases of Acute Flaccid Paralysis (AFP) associated with circulating vaccine-derived poliovirus (cVDPV) were detected in Cagayan de Oro, Cavite and Laguna provinces. Without intervention, these cVDPVs circulate, cause paralysis and propagate indefinitely in low immunity populations like wild polioviruses. This paper describes the government's response to the cVDPV.
Methods: We conducted an active retrospective search for AFP cases in hospitals in the affected regions, established aseptic meningitis virologic surveillance in the hospital where the first case was detected, collected stools from healthy contacts, conducted investigations of clustered AFP cases and assessed polio vaccination coverage in these communities.
Results: Surveillance records showed no AFP cases were missed. Aseptic meningitis cases were all negative for cVDPV. Specimens from more than 30 healthy contacts showed one positive for cVDPV. Despite enhanced surveillance, no cVDPV was isolated as of October 8, 2001. OPV3 coverage in the areas with cVDPV cases was above 80%.
Conclusions: The Health Department considered the situation a national emergency similar to importation of wild poliovirus and conducted a National OPV campaign to wipe out any cVDPV. A pilot campaign was conducted in December in areas where the 3 cases were detected. Round 1 was conducted from February 2-8, 2002 that included door-to-door OPV vaccination in high-risk areas. Other areas used the traditional fixed-site strategy of immunizing all children 0-59 months with OPV regardless of immunization status. Partial reports as of February 14 showed 10,874,317 (91.2%)children were vaccinated. Round 2 is scheduled on March 2-8, 2002.

Key words: Vaccine-derived poliovirus, AFP Surveillance, Nationwide public health response

[1] National Epidemiology Center, Philippines

P3. *Takeshi Tanaka,[1, 2] H. Takahashi, [2] T. Ohyama,[2] J. Kobayashi, [2] N. Okabe[2]*
Nosocominal S*erratia marcescens* Sepsis Associated With Contaminated Saline — Tokyo, Japan, 2002.

Background: In January 2002, 12 patients, including 7 fatal cases, had sepsis-like symptoms in a 33-bed hospital within 7 days. *Serratia marcescens* was initially isolated from blood of 2 cases.
Methods: To identify risk factors, a case-control study was conducted. A suspected case-patient was a febrile (≥38.5C) in-patient between December 20, 2001 and January 15, 2002. Confirmed cases also had *Serratia*-cultured from blood. Controls were afebrile (<38.5C) in-patients hospitalized in the observation period. Procedural and environmental investigations were also performed.
Results: We identified 24 cases 12 confirmed) with onsets between December 28 and January 14. These formed 4 clusters 3-5 days apart. The DNA-pattern analysis was identical. All case-patients had intravenous lines maintained with heparinized-saline ("heparin-lock") to avoid clogging. Heparinized-saline was prepared in 500mL amounts and left at room temperature for 1-4 days. The case-control study employing 29 controls indicated an intravenous route as a high risk factor (odds ratio [OR]:30.46, $P < 0.01$). Overall, heparin-locks showed no significance (OR: 1.69, $P = 0.62$). However, staff interviews indicated they were busier before this incident. We stratified study subjects into two parts: those who received heparin-locks only before December 25 and others. The latter showed a high risk (OR: 25.67, $P < 0.01$). The hospital did not use infection control guidelines and had unsanitary practices, including poor hand-washing. Environmental sampling recovered 3 *Serratia* isolates. One, recovered from the hand-washing sink, was identical with the patients'. These indicate heparinized-saline might have been contaminated with *Serratia* and caused this outbreak.
Conclusions: We recommended the hospital enhance hygiene and develop infection control standards and the local health department assist them. We will inform health care providers on the possible risk of heparin-locks.

Key words: nosocominal infection, *Serratia marcescens*, blood-stream infection, heparinized-saline

[1]FETP-Japan
[2]Infectious Disease Surveillance Center, National Institute of Infectious Diseases, Japan.

7:40 ***Rachel N. Bronzan, I. Niambele, F. Bougoudodo, S. Ndiaye, E. Baganizi, E. MacLachlan, G. Pappas, C. Ryan***

New Tool for Monitoring National Seroprevalence of Human Immunodeficiency Virus (HIV) — Mali, West Africa, 2001.

Background: HIV sentinel surveillance in antenatal clinics (ANC) has long been used as a surrogate marker of HIV seroprevalence in the general population. Few studies have examined the validity of this assumption. The Demographic and Health Survey (DHS) is a routinely administered, population-based survey that assesses knowledge, attitudes, and practices related to health, including HIV/AIDS. In the Malian 2001 DHS we included HIV testing, representing the first successful integration of HIV testing into such a survey and providing an opportunity to validate ANC HIV data with general population data.
Methods: Cluster sampling proportional to population size was used to select 13717 households nationwide. Women age 15-49 and one third of men age 15-59 were interviewed. All interviewed men and one third of interviewed women were offered HIV testing. Fingerprick blood was collected on filter paper for HIV testing. Informed consent was obtained separately for interviewing and HIV testing.
Results: Ninety-five percent of eligible women and 83.8% of eligible men consented to an interview. Of those persons interviewed, 86.9% of eligible women and 87.6% of eligible men consented to HIV testing. Altogether, 3845 women and 2962 men were tested for HIV. Results revealed an HIV prevalence of 1.3% for men and 2.0% for women in Mali. The highest rates were in urban men ages 40-49 (5.3%) and urban woman ages 30-39 (5.3%).
Conclusions: This is the first nationally representative study of HIV seroprevalence in an African country. Response rates for both the interview and HIV testing were high. This methodology provides population-based HIV prevalence data to validate ongoing ANC surveillance data. Repeated DHS surveys will allow correlation of trends in behavior with trends in HIV seroprevalence.

Key words: HIV seroprevalence, sentinel surveillance, validation studies, Mali, Africa

8:00 ***Victor Alva-Dávalos, [1] M. Ochoa-Linares,[1] C. Farfán-Obando,[1] J. Barrera-Mamani[2]***

Risk Factors for Severe Injury and Death During the Moquegua Earthquake – Perú 2001.

Background: Results of morbidity and mortality studies of disasters are usually limited to covering injury and primary cause of death. However, some investigations assess characteristics associated with the risk of severe injury and death for earthquake.
Methods: A case control study was conducted of patients and controls in Moquegua city, (21 patients, represented 18 deaths and 3 severe injuries). Controls were people who had been present at the time of the earthquake, but were not severely injured. We measured structural characteristics of the building in which people were located during the earthquake as predictors of risk for injury or death. The controls selection were randomly selected in three stages based on the block, the house within the block, and the persons within the house.
Results: The highest risk of death found was for woman compared to men, (OR 4.36 p=0.0197), and was highest for persons 70 years of age vs younger persons. (OR 8.63 p=0.0001), Among structural characteristics of homes, the following types had the highest risk: Houses older than 29 years vs. newer ones (OR 4.54 P=0.0099), mud houses vs. other houses (OR 8.77 p=0.0033). The risk was higher for persons of lower education levels compared to those of higher education levels. (OR 4.7 p=0.0026), persons sleeping or resting at the time of the earthquake compared to persons awake or active, (4.52 p=0.0027). We found that awareness of earthquake risks was protective against injury (OR 0.30 p=0.0145).
Conclusions: We evaluated characteristics of the buildings in which people were located during the earthquake, personal characteristics and behavioral characteristics of people who experienced the 2001 earthquake in Moquequa, Peru, to determine risk factors and levels for injury and death. Results of this investigation should be useful in prevention efforts to minimize negative health effects of earthquakes in this area.

[1] Residentes del Programa de Especialización en Epidemiología de Campo
[2] Epidemiólogo de la Dirección de Salud Moquegua

8:20 ***Nguyen Quoc Trung, D. Van Nguyen, D. Van Khoat, K. Ungchusak, C. Jiraphonsa***
Typhoid fever Outbreak Investigation — Tan Tien Village, Ha Tay Province, Vietnam, May – June 2001

Background: On May 15th 2001, a possible outbreak of typhoid fever occurred in Tan Tien Village, Ha Tay Province. An investigation team went out to verify the diagnosis, confirm the outbreak, describe epidemiologic characteristics, identify the mode of transmission, and implement immediate control measures.
Methods: The investigation team carried out a cross-sectional survey of all households in the village, examined medical records for all ill persons, and conducted laboratory tests and a case control - study. A confirmed case was defined as a person who sustained fever with at least one abdominal symptom, a positive blood culture, and a residence in this village in the period from May 15th to June 6th. Controls were selected from families in which cases had occurred or next door neighbors.
Results: Most of the cases occurred between May 21st to June 1st (37/45 cases). The outbreak could be traced to a common source: drinking river water. The most affected age group were people 10 to 19 years of age (attack rate 24.3%). Most common clinical symptoms were sustained fever, anorexia (100%), headache and abdominal pain (93.3%). Ten cases had positive blood cultures for *Salmonella typhi, serotype O, Vi*); 40 probable cases were identified through Widal testing. Nine of ten samples of river water were contaminated (Escherichia coli>20/ mL). Case finding, active treatment and reference, promotion of water clorination, and boiling of drinking water are all instituted. The case-control study showed an association between being ill and drinking river water =11.0, (or = 95% CI=3.42,37.5).
Conclusions: The outbreak might be due to the river water contaminated by feces from fishermen living in their boats and drinking river water. Health education on transmission of communicable diseases through river water continues after the end of the outbreak.

Key words: typhoid fever, outbreak, cross-sectional survey, case-control study, communicable disease

8:40 ***Mugenyi Kizito,[1] Z. Karyabakabo,[2] S. Sebudde[3]***
Health Workers' Knowledge and Practices on Malaria Case Management in Under Five Children — Rukungiri District, Uganda, September 2000

Background: Rukungiri district has experienced recurrent epidemics of malaria since 1998. The highest associated mortality rate has been for children 5 years of age. We hypothesized that this finding reflected poor malaria case management for this age group. We conducted a study to assess the quality of case management for children 5 years of age to provide information needed to design appropriate intervention strategies.
Methods: We conducted a cross-sectional study in 23 health units, selected by stratified random sampling. We reviewed 690 malaria treatment records for patients 5 years of age, interviewed 103 health workers, observed case management of 103 malaria patients 5 years of age, and conducted 10 key informant interviews.
Results: Eighty-two percent of the health workers had adequate knowledge to diagnose malaria, 78%, to provide health education; and 92%, to refer malaria cases on the basis of proper criteria. Forty percent of the health workers could not correctly assess a child for malaria. Only 36 % of these malaria patients were treated according to the standard treatment guidelines. Only 5% of the caretakers had been educated about malaria prevention.
Conclusions: The health workers' knowledge on malaria case management was generally adequate, but their practices were poor. There was low use of the national standard treatment guidelines on malaria, resulting into irrational use of antimalarials. Caretakers of malaria patients were rarely given health education on malaria prevention. Refresher training of the health workers to improve their skills, regular frequent support supervision, and sensitization of health workers to the importance of using of the national treatment guidelines, have been recommended.

[1] Institute of Public Health, Makerere University, Kampala, Uganda.
[2] Director of District Health Services, Rukungiri district, Uganda.
[3] Deputy Director of District Health Services, Rukungiri district, Uganda.

9 :00 *Tatiana M. Lanzieri,[1] R. Prevots,[2] M. Siqueira,[3] D. Conserva, [4] B. Lira, [5] L. Tavares,[1] M. Fahat,[6] T. Segatto[7]*

Congenital Rubella Syndrome Following a Community-Wide Rubella Outbreak – Rio Branco, Acre, Brazil, 2000 –2001

Background: Rubella infection during the first trimester of pregnancy has a risk of up to 90% for miscarriage, stillbirths and congenital defects (e.g. cataracts, cardiopathy, deafness) known as Congenital Rubella Syndrome (CRS). In Acre State, rubella vaccination targeting children aged 1-11 years was introduced in April 2000, with an estimated coverage of 95% achieved by August 2000. To evaluate rubella control strategies, we investigated a community rubella outbreak in Rio Branco, Acre.

Methods: Suspected cases were detected through passive case reporting, and active case finding conducted at health facilities, laboratory and community. Blood samples were taken for rubella-specific IgM antibody detection. Confirmed rubella cases were patients with rash, fever and rubella-specific IgM antibodies. Suspected CRS cases were infants born with CRS-compatible defects or born to mothers with a history of rubella during pregnancy. Confirmed CRS cases were infants with CRS-compatible defects and rubella-specific IgM antibodies.

Results: Of 1568 suspected rubella cases reported from Rio Branco from April 1st to December 31st, 2000, 391 (25%) were confirmed. The epidemic peak was in August. The incidence among persons aged 12-29 years (2.6/1,000 population) was increased 2.6 fold relative to children 1-11 (95%CI=2.1-3.5). Following the outbreak 21 suspected CRS cases were detected; 19 (91%) were tested for rubella-specific antibodies and four (19%) had confirmed CRS; fatality was 75%. The peak incidence of confirmed CRS (6.5/1,000 live births) was in March 2001.

Conclusions: Vaccination among school-age children was insufficient to prevent a rubella outbreak among young adults, with a high incidence of confirmed CRS seven months after the epidemic peak. Therefore, a vaccination campaign targeting persons aged 12-29 years was conducted in November 2000 and postpartum vaccination was implemented.

Key words: rubella outbreak, congenital rubella syndrome, rubella vaccination, rubella

[1] Field Epidemiology Training Program, National Health Foundation, Brazil
[2] Pan American Health Organization, Brasilia, Brazil
[3] Fundação Oswaldo Cruz (Oswaldo Cruz Foundation), Brazil
[4] Secretaria de Estado de Saúde do Acre (Acre State Health Department), Brazil
[5] Secretaria Municipal de Saúde de Rio Branco (Rio Branco Health Department), Brazil
[6] Laboratório Central de Saúde Pública "Dr. Djalma da Cunha Batista", Brazil
[7] National Health Foundation, Brazil

9:20 ***Aura C. Corpuz,[1] I. Grafil,[1] N. Orosco,[1] N. Villanueva, [2] L. Panganiban,[3] M. Castillo,[1] M. Roces,[1] M. Quizon[1]***

Pesticide Poisoning in a Rural Village — Quezon Province, Philippines, December 2000 – January 2001

Background: On January 25, 2001, cases of edema and neuropathy of unknown etiology and two deaths were reported in a rural village. We conducted an investigation to determine the cause of this outbreak.
Methods: We searched for more cases in the village and did a matched case-control study. A case was defined as a previously well individual who developed numbness of extremities and had any of the following: edema, dyspnea, easy fatigability, abdominal pain, nausea, or vomiting. Controls were well persons in the same village matched for age and sex. Blood samples were taken from cases. An environmental survey was done. Key informant interviews were conducted.
Results: Thirty-three persons ages 14 to 57 years (median 29) met the case definition. Seventy-nine percent were farmers. Patients became ill in December and January following shrimp kills in the river. Analysis of blood samples revealed hematologic abnormalities (decreased RBC counts and MCHC, high MCV, elevated SGOT levels). Test for Pesticide residues showed alpha and beta endosulfan from clam, rice field soil, and rice grain. Cases were four times more likely than controls to have used fertilizers (95% CI=1.11-15.80). Use of protective equipment when spraying, changing clothes, and washing after using fertilizer, lowered the chances of becoming ill.
Conclusions: The persistent presence of endosulfan (organochlorine) in the environment (aggravated by the spillage of DECIS-R (pyrethroid) had caused poisoning of shrimps and eventually caused illness and death among people who had eaten the shrimp. Farmers and fishermen were advised on the proper ways of using pesticides, their potential effects, signs and symptoms when poisoned, and appropriate first aid measures. The sale and use of pesticides in the area and neighboring towns have been strictly regulated.

Key words: pesticide poisoning, fertilizers

[1] National Epidemiology Center
[2] Center for Health Development for Southern Tagalog Region
[3] National Poisons Control and Information Service, UP-PGH

9:40 Presentation of the William H. Foege Award.

Wednesday Morning — April 24, 2002

8:30 Something is in the Air: Respiratory Health Problems. Moderator: Michael A. McGeehin

8:35 *Allison L. Stock, C. Brown, S. Redd, J. Sarisky, R. Comstock, H. Mainzer*
Suspected Illness Associated with Flooding and Mold Growth Among the Turtle Mountain Band of Chippewa — Belcourt, North Dakota, 2001.

Background: Molds are ubiquitous with >1,000 different types in indoor air. Mold growth is exacerbated by flooding and dampness. Between 30-50% of the structures in the northern US and Canada can be classified as damp. People spend almost 90% of their day indoors and no standards for indoor air concentrations of molds exist. Health effects, including asthma, hypersensitivity pneumonitis, upper respiratory ailments, and skin rashes are associated with indoor mold exposures but are not well-understood. The Belcourt area has had flooding since 1997 most recently in March 2001.
Methods: We conducted a cross-sectional survey to assess whether Native Americans who lived in 617 chronically flooded, government-subsidized homes in Belcourt, North Dakota were experiencing respiratory problems due to mold growth. In July 2001, 138 homes were randomly selected for a questionnaire based health survey. The questionnaire collected information on demographics, smoking status, pet ownership, mold exposures, standing water, and illness from each family member including proxy interviews for children <12. Analysis is restricted to individual questionnaire data.
Results: By August 2001, 96 families (n=237; aged <1 to 78, median =17) participated, 16 families (14%) refused, and 26 families (19%) moved, were migrant workers, or their homes had fires. Among persons who reported seeing visible mold in areas excluding their basements, bathrooms, or around windows/doors (72.2%), increased prevalence rates of skin rash or itch (PRR= 1.19, 95% CI= 1.03-1.39) (adjusted for smoking (APRR)=1.55 95% CI=1.02-2.36) and runny noses, stuffy noses, and irritated noses (PRR= 1.3, 95% CI=1.14-1.51; APRR=2.64, 95% CI=1.34-5.22) were seen. Asthma prevalence increased, but not significantly (PRR= 1.13 95% CI= 0.95-1.32; APRR=1.43 95% CI= 0.85-2.40).
Conclusions: Reported mold exposures were associated with skin and upper respiratory symptoms. Further research is needed to assess the occurrence of respiratory symptoms and illness with household mold exposures to determine the natural history of mold-related illness and to evaluate intervention strategies.

Key words: mold, flooding, respiratory symptoms, skin rash, public housing

8:55 *R. Charon Gwynn, J. Moorman, D. Mannino, E. Ford, C. Alverson, S. Redd*
Gender Differences in Adult Asthma Prevalence — United States, 2000.

Background: Reports indicate that 66% of the estimated 14.7 million adults with asthma in 2000 were women. The role of asthma risk factors in this gender disparity is unclear. Understanding gender-specific asthma risk factors' is of public health importance as such information can help guide intervention strategies.
Methods: As part of the 2000 Behavioral Risk Factor Surveillance System (BRFSS), 182,293 adults were asked questions to ascertain whether or not they had asthma. Gender-specific logistic regression was conducted to assess the association between reporting asthma and various risk factors. Adjusted odds ratios (AOR) were computed using SUDAAN to account for the complex survey design. Covariates included age, socio-economic status (SES), smoking status, race/ethnicity, body mass index (BMI), and urban residence.
Results: In both gender categories, younger adults and persons in the lower SES category were significantly more likely to report having asthma, while Hispanics were significantly less likely to report asthma. Reporting asthma was associated with former and current smoking status (AOR=1.31, 95% CI=1.18-1.45 and AOR=1.60, 95% CI=1.44-1.78, respectively) in females, but not males (AOR=1.12, 95% CI=0.98-1.29 and AOR=1.01, 95% CI=0.86 -1.18, respectively). Urban residence was significant in

females (AOR=1.13, 95% CI=1.02-1.24), but not in males (AOR=0.99, 95% CI=0.87 -1.12). Females reporting asthma were more likely to be overweight (AOR=1.25, 95% CI=1.13-1.39) or obese (AOR=2.02, 95% CI=1.82-2.24), while males were more likely to be underweight (AOR=2.62, 95% CI=1.51-4.57) or obese (AOR=1.21, 95% CI=1.03-1.43).
Conclusions: Smoking, increased BMI, and urban residence are significantly associated with increased asthma prevalence among American women, but not men. Public health personnel can target these risk factors, some of which are potentially modifiable, in the routine management of asthma in women.

Key words: asthma, prevalence, gender differences, socio-demographic factors

9:15 ***James A. Hayslett, P. Huang***
Economic Impacts of Clean Indoor Air Ordinances on Restaurant Economies in Four Texas Cities, 1987 and 1999.

Background: With the growing public awareness of the adverse health effects attributed to secondhand smoke and public pressure to implement clean indoor air ordinances (CIAOs), decision makers are balancing public health concerns with the potential effect of CIAOs on their local restaurant economies. In Texas, geographically pertinent assessment of the impact of implementing CIAOs on the local restaurant economies has not been done, even though CIAOs have been in effect for > 3 years for four cities.
Methods: Quarterly taxable restaurant and total retail sales revenue data were obtained from the State Comptroller's office for the years 1987–1999. Four cities (Arlington, Austin, Plano, and Wichita Falls) with CIAOs in effect for > 3 years were selected for evaluation. We performed an ecologic study using time-series regression analyses to assess the effect of CIAO implementation on the dependent variable of restaurant sales, alone and as a proportion of total retail sales.
Results: For the 13-year period reviewed, growth in total restaurant sales was observed in all four cities. Implementation of a CIAO was positively associated with total restaurant sales in all four cities, and this association was statistically significant in three. The implementation of a CIAO had a positive statistically significant effect on the restaurant sales as a proportion of total retail sales in one city and no statistically significant effect in the other three cities.
Conclusion: In the four cites studied, the models provide reasonable evidence that the implementation of a CIAO does not adversely affect restaurant economies, either alone or as a proportion of their respective communities.

Key words: tobacco, economics, health policy, smoking

9:35 ***Rachel J. Gorwitz, M. Javadi, R. Benson, M. Moore, L. Nguyen, P. Rowley, E. Zell, C. Lucas, E. Brown, L. Scott, R. Bell, D. Kwalick, B. Fields, R. Besser***
Outbreak of Travel-Related Legionnaires Disease — Las Vegas, 2001.

Background: A minority of the 8,000 to 18,000 Legionnaires' disease (LD) cases occurring annually in the United States are diagnosed and reported, despite a 10% case-fatality rate. Travel may increase LD risk; however, dispersal of infected persons away from the transmission source before symptom onset hinders detection of travel-related outbreaks. Between January and May 2001, three individuals from different states were diagnosed with LD after staying at the same Las Vegas condominium complex. An environmental investigation and case-control study were initiated to identify potentially ongoing sources of and opportunities to prevent transmission.
Methods: Water specimens from the complex were cultured for *Legionella*. Letters sent to all guests registered between January 1 and August 10, 2001 sought individuals hospitalized with pneumonia within two weeks after their stay. Four randomly selected non-ill guests were matched to each patient by arrival date. A telephone questionnaire delineating exposures was administered. Matched odds ratios (MORs) were calculated for disease-exposure associations.
Results: Five laboratory-confirmed (including one incidentally identified case from July 2000) and 16 clinically suspected LD cases occurred among residents of 13 states. *Legionella* isolates of identical molecular subtype were cultured from an index patient and from the complex's potable water system and whirlpool. Eighty-three percent of patients stayed in the complex's second tower, compared with 45% of controls (MOR=8.0, 95% confidence interval=1.7-37.3). A positive dose-response relationship was

observed between daily aerosolized potable water exposure and odds of disease. Disease was not associated with whirlpool use.
Conclusions: LD transmission via aerosolized potable water in the complex's second tower likely began over a year before detection. Improved national surveillance for travel-related LD is needed to expedite future outbreak interruption.

Key words: Legionnaires' disease, *Legionella pneumophila*, travel-associated legionellosis, surveillance

10:30 Close Quarters: Institutional and Community Outbreaks. Moderator: Jeffery P. Davis

10:35 *Carolyn M. Greene, M. Javadi, T. Hilger, B. Beall, K. Arnold, D. Abercrombie, C. Van Beneden*
Cluster of Deaths from Group A Streptococcus in a Nursing Home — Georgia, 2001.

Background: Invasive Group A Streptococcus (GAS) causes approximately 9000 cases annually in the United States; one in five patients older than 65 years die from their infection. In August 2001, CDC was contacted to investigate a cluster of GAS deaths in a Georgia nursing home to identify modifiable risk factors and assist in outbreak control.
Methods: All nursing home residents and staff were screened for GAS carriage. To identify risk factors for illness and carriage, we conducted a retrospective cohort study among residents. We defined a case as isolation of GAS from any site in association with clinical infection. Univariate and multivariate analyses were performed.
Results: Eight cases were identified (mean age of 80.6 years, range=69-94); six (75%) patients died. Carriage was similar in residents (9.8% of 112) and staff (8.5% of 94). By univariate analysis, risk factors for GAS disease or carriage among residents were vascular disease, skin breakdown, receiving skin treatment, and having a roommate with GAS disease or carriage. By multivariate analysis, receiving skin treatment (RR=4.01, 95% Confidence Interval [CI]=1.91-11.01) and having a roommate with GAS disease or carriage (RR=2.01, CI=1.10-5.06) remained associated with GAS status. No wound care nurse carried GAS. All carriers received antibiotic treatment and infection control measures were improved (e.g., placing more hand sanitizers and glove boxes on each hallway). No subsequent GAS cases have been identified as of January 8, 2002.
Conclusions: No point source of infection was discovered; risk factors identified suggest transmission of GAS occurred during wound care. Enhanced infection control measures halted this outbreak. Given the mortality from GAS in the elderly, adherence to effective infection control practices in nursing homes is critical.

Key words: Group A Streptococcus, long-term care facilities, infection control, disease outbreaks

10:55 *Marc S. Traeger, S. Wiersma, C. Blackmore*
Risk Factors for Flouroquinolone-Resistant *Salmonella senftenberg* in a Long-Term Care Facility Outbreak — Florida 2000 –2001.

Background: Recent reports indicate that flouroquinolone-resistant salmonella transmitted person-to-person might be an emerging threat in the United States. Flouroquinolone antibiotics are first-line therapy for severe salmonella infections. An outbreak of flouroquinolone-resistant *Salmonella* Senftenberg occurred in a Florida long-term care facility (LTCF) during December 2000-March 2001 after a carrier transferred to the facility in September 2000. We evaluated risk factors for flouroquinolone-resistant salmonella infection at this facility with a case-control study.
Methods: Case-patients were LTCF residents during September 2000-April 2001 with a culture yielding flouroquinolone-resistant *S.* Senftenberg, excluding the index case. Isolates were compared by pulsed field gel electrophoresis (PFGE). Cases were identified through laboratory reporting and by screening current residents. Controls were LTCF residents on March 6 who did not have *S.* Senftenberg isolated in any culture before discharge or 5/1/01, but had submitted urine or stool for culture. Chart reviews to evaluate

health status and exposures were performed for subjects for the 6 months before their earliest positive culture (cases) or most recent negative culture (controls).
Results: Eight case-patients and 25 controls were identified and were similar in age, sex, race, and duration of LTCF residence. Case-patient isolates from urine, stool, or blood cultures were indistinguishable by PFGE. Of eight case-patients, seven received enteral tube feedings (odds ratio [OR]=14.9, 95% confidence interval [CI]=1.6-142), and received six different formulas. Infection was associated with vancomycin-resistant enterococcus colonization (OR=undefined, lower 95%CI=3.8), tracheostomy (OR=37, 95%CI=3.5-386), central intravenous catheter (OR=14.3, 95%CI=2.1-98), and ventilator (OR=12, 95%CI=1.8-78). No single risk factor was independently associated with infection by stratified analysis.
Conclusions: Flouroquinolone-resistant *S.* Senftenberg transmission in this LTCF was not foodborne, but likely person-to-person, and was associated with multiple risk factors.

Key words: *Salmonella*, *Salmonella* Senftenberg, flouroquinolone resistant, multi-drug resistant, flouroquinolone, case-control study, VRE, enteral feeds, tracheostomy, respiratory failure, sepsis

11:15 *Adrian Stoica , D. Drociuk, S. Carnesale, G. Elliot, L. Bell, J.. Gibson*
Multifacility Outbreaks of Salmonellosis Among South Carolina Department of Corrections Inmates, February –March 2001.

Background: Contaminated food in institutional settings places large populations at risk. In March 2001, the South Carolina Department of Corrections (DOC) reported large outbreaks of gastroenteritis in women and men's facilities.
Methods: To determine the cause of the outbreaks, we interviewed randomly sampled case-patients and controls from each facility. The case definition was onset of acute gastrointestinal symptoms (diarrhea, abdominal cramps, nausea, vomiting) in an inmate during March 2-7.
Results: The attack rate was 46% (152/350) in the women's facility and 34% (261/857) in the men's facility. No staff cases or hospitalizations occurred. Among sampled patients, illness sharply peaked March 3-4. Both facilities were served by one kitchen. The March 2 lunch, consumed by 91% of the female case-patients (odds ratio [OR]=23, 95% confidence interval [CI]=5.0–121.8) and by 88% of the male case-patients (OR=3.7, 95%CI=0.9–16.5), was implicated. For that meal, only tuna salad with egg was associated with illness in both facilities (women OR=16.7, 95% CI=4.1–74.7; men OR=7.0, 95% CI 1.7–30.5). *Salmonella* Enteritidis (SE) phage types 2 and 13A were isolated from case-patients. During February-March 2001 we identified two other SE outbreaks in DOC facilities involving phage types 2 and 13A. The eggs supplied to DOC during February-March were all traced back to one distributor. In February 2001, SE phage types 2, 13A, 22, 23, and 28 had been identified at this egg distributor.
Conclusions: Multiple outbreaks of SE infections in DOC facilities were probably caused by contaminated eggs from a single distributor. The supply of liquid pasteurized eggs to prisons could prevent egg-associated SE outbreaks among inmates. Therefore DOC switched to pasteurized eggs.

Key words: *Salmonella* infections, outbreaks, prisons, case-control studies, eggs

11:35 *Susan H. Wootton, K. Arnold, M. Ray, S. McAllister, J. Mohammed, M. Kuehner*t
Control of an Outbreak of Methicillin-Resistant *Staphylococcus aureus* Skin Infections in a Correctional Facility Setting: Systemwide Prevention Approach — Georgia, 2001.

Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) is an important cause of skin and soft tissue infections and has been associated with both health-care and community settings. Only recently, however, have MRSA outbreaks been described within correctional facilities (CF). After seven detainees of one CF (CF-A) became infected with MRSA, the GDPH initiated an investigation to identify risk factors for MRSA skin infection and to evaluate interventions for preventing future outbreaks.
Methods: We administered a questionnaire to CF-A detainees for a case-control study. A case was defined as development of a skin lesion in a CF-A detainee from which MRSA was isolated during June 1 – September 30, 2001. Controls were randomly selected. Monthly prevalence of MRSA skin infections was calculated as the number of case-patients divided by the average monthly census. Intervention included active surveillance for skin lesions, oral and intra-nasal antimicrobial therapy to case-patients,

antiseptic body wash and antimicrobial-containing soap to all detainees, and measures to improve personal hygiene and wound care.
Results: Of the 193 CF-A detainees, 11 met the case definition. Three (27%) case-patients had recurrent skin disease. Seven (63%) of the 11 case-patients and 19 controls were interviewed. No risk factors were significant, although trends included association with a history of self-'popping' skin lesions (Odds Ratio [OR] 4.36, 95% Confidence Interval [CI] =0.36-116.36) and working as dorm orderlies (OR 6.67, 95% CI=0.56, 178.11). The monthly prevalence of MRSA skin infection in CF-A declined significantly after implementation of the intervention (9/197 vs 0/197, p=0.002). No new infections were detected as of 10/11/01.
Conclusions: A multi-modal intervention, including educational programs emphasizing regular skin hygiene, was helpful in altering the transmission of MRSA in a CF setting.

Key words: staphylococcal skin infections, methicillin resistance, correctional facility, Georgia, disease outbreaks

11:55 ***Richard F. Leman, F. Alvarado, M. Kuehnert, S. Pocock, S. McAllister, M. Kellum, J. Cheek***
Community-Associated Methicillin-Resistant *Staphylococcus aureus* Nasal Carriage Among an American Indian Population — Washington, 2000–2001.

Background: Methicillin-resistant *Staphylococcus aureus* (MRSA) has been associated primarily with inpatient settings, where it is a major cause of infections. Recent reports of MRSA infection in patients without known health-care exposure, however, suggest transmission in community settings. In spring 2000, a cluster of suspected community-associated MRSA (CA-MRSA) infections occurred at an Indian Health Service clinic in Washington. We conducted a carriage survey to assess MRSA carriage in this community.
Methods: We enrolled 469 randomly selected persons from the 16,600 patients registered at the clinic, cultured the nares of each, and assessed risk factors for MRSA carriage. We defined CA-MRSA carriage as a nasal culture yielding MRSA in a person with no hospitalization, residence in a long-term care facility, dialysis, nor work in a health-care facility in the previous year.
Results: Of all participants, 378/469 (80.6%) had no inpatient health-care exposure. *Staphylococcus aureus* grew from 128/469 (27.3%, 95% CI = 23.3–31.6) of the carriage survey cultures. Of a total of 469 cultures, nine (1.9%, 95% CI = 0.68–3.2) yielded MRSA, five of which were CA-MRSA, giving a prevalence rate of 1.3% (95% CI = 0.14 – 2.0). MRSA colonization was associated with previous antimicrobial use (RR=7.5, p=0.033) and household size >7 persons (RR=5.2, p=0.018).
Conclusions: This population-based survey demonstrates MRSA colonization among members of this rural community. Much of the population had no inpatient health-care exposure and would not be expected to carry MRSA. Review of antimicrobial use or factors associated with overcrowding might help identify interventions to limit community spread of MRSA.

Key words: epidemiology, North American Indians, antimicrobial resistance

Wednesday–Thursday Poster Session

12:30 Poster Session No. 2 — Meet the Authors

Anthrax and Other Bacterial Diseases: Risks for Workers, Risks for the Community

P1. ***Pratima L. Raghunathan for the National Anthrax Bioterrorism Response Team***
First Outbreak of Bioterrorism-Related Anthrax — Florida, New York, Metropolitan District of Columbia Area, New Jersey, Connecticut, 2001.

Background: In October 2001, the first US inhalational anthrax case since 1976 was linked to intentional workplace contamination with *Bacillus anthracis*. A multistate investigation uncovered additional cases and exposures.
Methods: Surveillance was enhanced at hospitals and affected worksites to identify cases, defined as clinically compatible illness with laboratory-confirmed *B. anthracis*. Teams investigated ill and exposed individuals and sampled suspected exposure sources. *B. anthracis* isolates were analyzed using molecular subtyping.
Results: Between 10/04/2001 – 1/11/2002, 22 cases of anthrax (11 inhalational, 11 cutaneous) were identified. Inhalational case-patients were older than cutaneous case-patients (median 56 vs 35 years, p=0.0012); deaths occurred only among inhalational case-patients (5/11, 45%). Twenty (91%) case-patients were exposed to worksites where *B. anthracis*-contaminated mail was processed or received; two case-patients lack definitive exposures. *B. anthracis*-containing envelopes (at least two postmarked 9/18/2001) were sent to media companies where exposure went unrecognized and 9 employees became ill (2 inhalational). At least two envelopes (postmarked 10/09/2001) were sent to government leaders, and one was opened. Because recipients suspected anthrax, intervention was promptly undertaken onsite. Unrecognized contamination at mail facilities led to 11 cases (7 inhalational) primarily among mail handlers. Post-exposure prophylaxis was recommended for 10,000 media, government, and mail workers; no additional cases of anthrax have occurred. *B. anthracis* was isolated from 10 case-patients, 4 powder-containing envelopes, and 15 sites along the mailed path of contaminated envelopes; isolates tested were indistinguishable by molecular subtyping.
Conclusions: Envelopes containing *B. anthracis* were intentionally mailed, leading to disproportionate illness and death associated with delivery paths compared to bioterrorism target sites. Early recognition of *B. anthracis* exposure prevented disease. Intentional release of biological agents may recur with unanticipated modes of exposure.

Key words: anthrax, *Bacillus anthracis*, bioterrorism, outbreaks, mail

P2. ***Colin Shepard for the National Anthrax Bioterrorism Response Team***
Adverse Events Associated with Post-Exposure Antimicrobial Prophylaxis for Prevention of Anthrax — Florida, New Jersey, New York City, Maryland, Virginia, and Washington, DC, 2001.

Background: In October 2001, an unprecedented prevention program targeted thousands of persons exposed to a bioterrorist attack of *Bacillus anthracis* with antimicrobial prophylaxis. We evaluated adverse events associated with this intervention.
Methods: We defined an adverse event (AE) as any patient-reported symptom temporally associated with prophylaxis; a severe AE was hospitalization attributed by physician to antimicrobials. Self or nurse-administered questionnaires at 10 and 30 days gathered data on AEs and adherence; additional data was gathered from patients and physicians for those who sought medical attention. A 60-day evaluation is ongoing.
Results: Of 10,102 persons offered prophylaxis (FL-1149, NYC-3714, NJ-1529, DC/MD/VA-3710), 42% and 31% were surveyed at days 10 and 30, respectively. Most (58%) were male and 18-64 years of age

(93%). At day 10, 92% reported using ciprofloxacin (500mg bid) while at day 30, 61% used doxycycline (100mg bid) and 22% ciprofloxacin; <5% used other antimicrobials.
More persons reported ≥1 AE at day 30 than day 10 (68% vs. 45%, p<0.001). At day 30, the most common symptoms were severe nausea/vomiting/diarrhea/abdominal pain (gastrointestinal symptoms) (41%), fainting/lightheadedness/dizziness (19%), and rash/hives/itchy skin (14%). Overall, AEs were equally likely to be reported for either antimicrobial at day 30, except for severe GI symptoms, which, at day 30, were more frequent among persons on doxycycline than ciprofloxacin (45% vs. 32%, p<0.001). By day 30, 400 (4%) persons had sought medical attention for AEs, but none were severe. At day 30, 382 persons (12%) missed a dose or discontinued prophylaxis because of AEs.
Conclusions: Frequently-reported AEs fell into predictable categories based on antimicrobials used. While reported often and increasingly through day 30, AEs were not a common reason for non-adherence.

P3. ***James J. Sejvar, D. Johnson, T. Popovic, M. Miller, F. Downes, B. Whitley, D. Stephens, B. Perkins, N. Rosenstein***
Risk for Meningococcal Disease Among Laboratorians, 1985 -2000.

Background: *Neisseria meningitidis* is a leading cause of bacterial meningitis and sepsis in the United States. Although regularly isolated in laboratories, it is infrequently reported as a cause of laboratory-acquired infection. We assessed this risk among laboratory scientists.
Methods: To detect cases of laboratory-acquired meningococcal disease, a request for information was posted on selected electronic mail discussion groups of infectious disease, microbiology, and infection control professional organizations. A probable case was defined as a laboratory scientist meeting the case definition for meningococcal disease who had occupational exposure to a *N. meningitidis* isolate of the same serogroup in the 14 days prior to onset of illness.
Results: Sixteen cases of probable laboratory-acquired meningococcal disease occurring worldwide in the past 15 years were detected. Nine cases (56%) were due to serogroup B; seven (44%) were due to C. Six U.S. cases occurred in the past 5 years. Eight cases (50%) were fatal. All cases occurred among microbiologists. In 15 (94%) cases, isolate manipulation was performed without respiratory protection. We estimated that an average of 3 microbiologists are exposed to each of the 3,000 meningococcal isolates seen in U.S. laboratories each year, and calculated an attack rate of 13/100,000 (95% Confidence Interval 5-29/100,000) between 1996 and 2000, compared to 0.2/100,000 among U.S. adults.
Conclusion: The absolute rate and the case-fatality ratio of meningococcal disease among microbiologists are substantially higher than that in the general U.S. population. Specific risk factors for laboratory-acquired infection are most likely associated with exposure to droplets or aerosols containing *N. meningitidis*; consequently, prevention should involve strict adherence to laboratory safety and the implementation of additional respiratory safety precautions when manipulating meningococcal isolates.

Key words: *N. meningitidis*, laboratory-acquired infection

P4. ***Marion A. Kainer, A. Do, B. Kuo, K. Limpakarnjanarat, W. Su, W. Uthaivoravit, W. Jarvis, the Healthcare Personnel Tuberculin Skin Test Study Group***
Vesiculating Reactions to Tuberculin Skin Testing Among Health-Care Personnel in Taiwan and Thailand.

Background: Worldwide, tuberculosis (TB) is the most common cause of death in adults from a single infectious agent. Tuberculin skin tests (TST) are widely used in the United States to diagnose *Mycobacterium tuberculosis* infection. Vesiculating reactions associated with TSTs rarely are reported. When TST-associated (Tubersol) vesiculating reactions were noted during cross-sectional healthcare personnel (HCP) surveys to assess the prevalence of *M. tuberculosis* infection at two hospitals in Taiwan and Thailand, an evaluation of risk factors was instituted.
Methods: All HCP with TSTs at the two hospitals were included. Exposure history, demographics, and presence of Bacillus Calmette-Guerin (BCG) scars were recorded. TSTs were read at 48-72 hours; if induration was <10mm, HCP underwent a second TST to evaluate boosting effect. TST positivity was defined as ≥15mm induration.
Results: Of 1435 HCP tested, 78% had indurations ≥10mm, 58% had indurations ≥15mm, and 15.6% had vesiculating reactions. Vesiculation correlated with induration size (p<0.001). On multivariate

analysis, duration of employment (≥2 years for Thailand), being a HCP in Taiwan, and having frequent direct patient contact were independent risk factors for vesiculation; prior university or college attendance was protective. All vesiculating reactions subsided after two to three weeks following treatment with 1% topical hydrocortisone cream; there was no permanent scarring. Vesiculation was not associated with active tuberculosis in HCP.
Conclusion: Vesiculating reactions and TST positivity were common among HCP in Taiwan and Thailand. Duration of employment and frequent direct patient contact were risk factor for vesiculation, suggesting that ongoing, intense exposure to *M. tuberculosis* is responsible for the high prevalence of vesiculation and that TB infection control measures require enhancement to reduce TB risk to HCP.

Key words: Mycobacterium tuberculosis, tuberculin test, vesiculation, health personnel, occupational exposure, disease transmission

P5. ***Katherine A. Feldman, D. Stiles-Enos, K. Julian, B. Matyas, S. Telford, M. Stanley, T. Sealy, J. Schilz, L. Petersen, E. Hayes***
Are Martha's Vineyard Landscapers at Increased Risk for Tularemia? — Massachusetts, 2001.

Background: In 2000, a tularemia outbreak occurred on Martha's Vineyard (MV). Five of 15 case-patients were landscapers. After additional cases in landscapers were reported in 2001, we conducted a study to determine the seroprevalence of antibodies to *Francisella tularensis* in landscapers compared to other MV residents and to determine risk factors for exposure to *F. tularensis* among landscapers.
Methods: From July through October 2001, 132 MV landscapers, 103 MV residents enrolled from doctor's offices and civic organizations, and 207 healthy residents who had blood drawn for other reasons (99 in July, 108 in October) provided serum samples that were tested for antibodies to *F. tularensis*. Landscapers completed questionnaires about possible risk factors.
Results: Twelve (9.1%) of 132 landscapers had antibodies to *F. tularensis*, compared to one (1%) of 99 MV residents from the July collection (RR=9.0, 95% CI = [1.2, 68.1]). All other samples were negative. Two seropositive landscapers reported having had tularemia, and one reported an undiagnosed febrile illness in the past year. Seropositive landscapers mowed more lawns (mean 31.4 vs. 13.4 lawns per week, p=0.001) and used weed-whackers more (mean 28.3 vs. 11.7 hours per week, p=0.01) than seronegative landscapers. Landscapers who used powered blowers were 9.2 times more likely (95% CI = [1.2, 69.0]) than other landscapers to be seropositive. Seropositive and seronegative landscapers had similar exposure to ticks and sick or dead mammals.
Conclusions: MV landscapers were nine times more likely to have antibodies to *F. tularensis* than other MV residents. Landscapers who used powered blowers and those who mowed and used weed-whackers more often were more likely to be seropositive. Tularemia prevention on MV should focus on aerosol-generating landscaping activities.

Key words: tularemia, seroepidemiologic studies, public health, *Francisella tularensis*

Infectious Diseases: Water-Born or Water-Borne

P6. ***Padmini Srikantiah, J. Lay, J. Crump, S. Hand, J. Campbell, V. Janakiraman, H. Fletemier, R. Middendorf, S. Van Duyne, M. Currier, P. Mead, K. Molbak***
Plague o' Frogs: Outbreak of *Salmonella* Javiana Infections — Mississippi, 2001.

Background: Salmonellosis causes over 1.4 million illnesses in the United States each year. Although *Salmonella* Javiana (SJ) is the fifth most commonly isolated *Salmonella* serotype among humans nationwide, the sources for human infection are largely unknown. During the summer of 2001, an outbreak of SJ infections occurred among children in Jackson, Mississippi, providing an opportunity to examine risk factors for infection.
Methods: We conducted a case-control study, and defined a case as infection with SJ between August and September 2001 in a Mississippi resident. Two age-and county- matched controls per case were randomly

selected from the Mississippi state birth registry and through sequential digit dialing. Pulsed-field gel electrophoresis (PFGE) was performed on all SJ isolates.
Results: We enrolled 55 cases and 109 controls. Among patients, thirty-three (58%) were female and the median age was 24 months (range 3 months to 70 years). Symptoms included fever (86%) and bloody diarrhea (44%). Nine (16%) patients were hospitalized; none died. Molecular subtyping of 51 isolates yielded 18 distinct PFGE patterns, suggesting multiple sources of infection. Thirty (55%) case-patients reported exposure to amphibians, defined as owning, touching, or seeing an amphibian on one's property, compared with 30 (29%) controls (matched odds ratio 2.8, p=0.006).
Conclusions: Contact with amphibians and their environments may be a risk factor for human infection with SJ. Interestingly, human infection with SJ is most common in regions of the southeastern United States, mimicking the geographic distribution of certain amphibian species. Public health officials should consider amphibians along with reptiles as potential sources of salmonellosis, and promote hand washing after contact with amphibians to decrease the risk of infection with *S.* Javiana.

Key words: *Salmonella*, amphibian, epidemiology, reservoir

P7. ***Andi L. Shane, N. Tucker, J. Crump, S. Nowicki, M. DiOrio, F. Smith, E. Koch, M. Bundesen, M. Adcock, T. Ingram, J. Painter, E. Mintz***
Sharing Shigella: Risk Factors and Costs of a Multi-Community Outbreak of Shigellosis — Southwest Ohio, 2001.

Background: Children ≤5 years comprise 50% of the 450,000 annual shigellosis cases in the United States. From May to September 2001, an outbreak of >1600 *Shigella sonnei* infections occurred in southwest Ohio. The state implemented screening and exclusion policies after case finding suggested that illness was associated with daycare attendance.
Methods: We randomly selected and interviewed 56 families with patients ≤5 years and 25 directors of daycares with ≥1 confirmed case. Standardized questionnaires were used to determine risk factors for transmission and to assess the economic impact of screening and exclusion policies.
Results: Of fifty-six patients, 53 (95%) were symptomatic, 55 (99%) attended daycare, and 2 (2%) were hospitalized. Forty-eight (86%) daycare attendees were excluded at a cost to families of $692 per child. The attack rate was 4.5% in classrooms with all children diapered, 9.4% in exclusively toilet-trained classrooms, and 14% in mixed classrooms. Daycares with attack rates above the median were more likely to have kiddie pools (Relative Risk [RR] 2.5, 95% Confidence Interval [CI]=1.5-4.3) and families who were uncooperative with exclusion policies (RR=2.8, CI =1.3-5.0). They were less likely to instruct staff on effective handwashing (RR=0.5, CI=0.3-0.8), have available handwashing supplies, (RR=0.5, CI=0.3-0.7), and have inaccessible soiled diapers (RR=0.3, CI=0.1-1.0). Staff were excluded for a total of 200 days and children for >1800 days due to shigellosis. The cost of detecting an asymptomatic case-patient was $41 in classrooms with an index case and $88 in other classrooms.
Conclusions: Daycares may contribute to costly, multi-community outbreaks. Public health interventions should focus on ensuring effective handwashing, providing child-accessible facilities, providing secure diaper disposal, restricting kiddie pools, and gaining family participation in outbreak control measures.

Key words: *Shigella sonnei*, daycare, diarrhea, handwashing, economic impact

P8. ***Joslyn D. Cassady, S. Seys, A. Heryford, K. Musgrave***
Outbreak of "Norwalk-Like Virus" Linked to a Contaminated Water System — Wyoming, 2001.

Background: "Norwalk-like viruses" (NLVs) are the most common cause of acute nonbacterial gastroenteritis in adults. In October 2001, the Wyoming Department of Health (WDH) was notified of six cases of acute gastroenteritis among persons who dined at a tourist restaurant in a historic mining community in central Wyoming.
Methods: We conducted a retrospective cohort study by telephone interview to identify risk factors associated with gastroenteritis. A case of gastroenteritis was defined as an episode of vomiting or diarrhea occurring 1-72 hours after eating at the restaurant. Between September 1 and October 22, approximately 1,360 patrons dined at the restaurant. Patrons were identified through credit card receipts, cancelled checks,

word-of-mouth, and calls to the WDH after media coverage. In addition, an environmental assessment was conducted, and stool samples were collected from patrons.

Results: A list of 120 patrons was generated; 111 patrons were interviewed**.** Eighty four (76%) persons met our case definition of acute gastroenteritis. A total of 81 (96%) cases and 17 (63%) noncases drank water at the restaurant. Cases were more likely than noncases to have exposure to drinking water (relative risk=3.6, 95% confidence interval=1.3-9.7). From the well that supplied water to the restaurant, five out of six well samples were positive for fecal coliforms. Using reverse transcriptase-polymerase chain reaction, NLV genogroup I was detected in three out of three stool samples and one well sample.

Conclusions: Fecal contamination of well water was associated with at least eighty-one cases of gastroenteritis among restaurant patrons. Well-water outbreaks such as these are preventable. Interagency collaboration is necessary to adequately monitor wells, follow up on fecal coliform positive tests, and evaluate environmental factors in contaminated groundwater.

Key words: Norwalk-like virus, gastroenteritis

P9. ***Louise M. Causer, T. Handzel, P. Welch, M. Carr, D. Culp, R. Lucht, K. Mudahar, D. Robinson, E. Neavear, S. Fenton, C. Rose, L. Craig, J. Ealey, M. Arrowood, S. Wahlquist, J. Priest, L. Xiao, Y-M. Lee, L. Mirel, D. Levy, M. Beach, G. Poquette, M. Dworkin***

Recreational Waterpark Outbreak of *Cryptosporidium parvum* — Illinois, August 2001.

Background: The chlorine resistance of *Cryptosporidium parvum* (*Cryptosporidium*) has contributed to its emergence as the leading cause of swimming pool-associated diarrheal outbreaks in the United States. During August 2001, a hospital in Illinois reported a cryptosporidiosis cluster potentially linked to a local waterpark. The subsequent investigation involved Tazewell County, Illinois Department of Public Health and CDC.

Methods: We collected descriptive case information and conducted a community-based case-control study to examine potential sources of the outbreak. We collected stool specimens from ill persons and pool water samples for microscopy and molecular analysis.

Results: We identified 358 case-patients. Laboratory-confirmed case-patients (N=77) experienced diarrhea (95%), vomiting (64%), and abdominal cramps (88%) and had a median age of 9 years (range 1-72; 78%<18). Forty-eight (63%) visited a physician and 7 (10%) were hospitalized. Preliminary results indicate that laboratory-confirmed case-patients were more likely to have attended Waterpark A than age-matched controls (OR=16, 95% CI=3.8-66.8). *Cryptosporidium* was found in stool specimens and pool water samples.

Conclusions: This is one of the largest documented swimming pool-associated outbreaks of cryptosporidiosis in the United States. The outbreak, primarily affecting adolescents/children, was associated with visiting Waterpark A in which the pool water was contaminated with *Cryptosporidium*. The magnitude of exposure to swimming (> 400 million annual visits nationally), high bather densities, and heavy usage by diaper-aged children have also contributed to the increasing trend in the number of swimming pool-associated outbreaks. Recommendations for disease prevention include separation of toddler pool filtration systems from other pools, and implementation of education programs for staff and patrons regarding measures that could reduce the risk of fecal contamination and disease transmission.

Key words: cryptosporidium, swimming pools, disease outbreak, parasites

P10. ***Megan E. Reller, C. Mendoza, B. Lopez, M. Alvarez, M. Hoekstra, S. Luby***

Health Outcome Evaluation of A Novel Technology to Purify Water: Household-Based Flocculation and Chlorination of Drinking Water — Guatemala, 2001.

Background: Worldwide 1.5 billion persons lack safe drinking water. In-home treatment of water with chlorine diminishes diarrhea when used; however, chlorine lacks a visual signal of its effectiveness, and has been accepted by few long-term. Procter & Gamble has developed a flocculation and chlorination technology (flocculant) that not only reduces microorganisms and heavy metals but also removes organic material to render murky water clear. In August 2001, we launched a yearlong study to evaluate the flocculant's effect on diarrhea.

Methods: We assigned 492 rural Guatemalan households randomly to 1 of 5 groups: bleach, flocculant, bleach plus vessel, flocculant plus vessel, and control. We assessed potability of water ($\geq$ 0.1 mg of free chlorine/Liter) at baseline and monthly, and assessed diarrhea weekly. We initially provided instruction only when interventions were distributed. After month 4, we reiterated the importance of water treatment during weekly surveillance visits.
Results: At baseline, 1% of water samples from intervention households were potable; however, 21% were potable at 4 months and 47% were potable after 3 rounds of weekly encouragement. After adjustment for age, week of study, and repeated measurements, only persons in households given flocculant plus vessel had significantly less (15%, $P<0.0001$) diarrhea than control by week 17. Households given flocculant, alone or with a vessel, had less turbid water (51% mean reduction) than control.
Conclusions: A one-time educational program did not effect widespread regular use of any of the point-of-use interventions. Even with suboptimal use, however, the flocculant plus vessel reduced diarrhea. The visual appeal of clear water and the potential for profit-funded continual promotion of the flocculant could result in sustained use, thereby empowering households to reduce diarrheal illness.

Key words: flocculation, water purification, water microbiology, Guatemala

Health Problems Among Adults

P11. *Rachel N. Bronzan, L. Echavarria, J. Hermida, F. Meyers, T. Burns, M. Trepka, K. Fox*
Syphilis Among Men Who Have Sex with Men — Miami-Dade County, Florida, 2001.

Background: Rates of infectious syphilis in Miami-Dade County, Florida have increased each year since 1998, and cases among MSM have increased twenty-fold during that time. These trends threaten successful U.S. syphilis elimination activities and likely contribute to HIV transmission. This study elucidates factors contributing to this syphilis increase among MSM by describing characteristics associated with acquiring syphilis, determining HIV co-infection rates, and describing knowledge of syphilis among MSM in Miami-Dade County.
Methods: A case-control study compared MSM with early syphilis, diagnosed between January 1 and June 30, 2001 and reported to Miami-Dade County Health Department, with MSM seeking care at similar venues and having negative syphilis serologies. Two controls per case were frequency matched by age and care venue. Interviews assessed sexual behaviors, condom use, venues where sexual partners were recruited, HIV status, and general knowledge of syphilis.
Results: Of 42 men who met the case definition, 35 (83%) were successfully contacted, of which 25 (71%) consented to interview. Forty-six controls have been interviewed. Self-identification as bisexual rather than homosexual, and meeting partners at either of two specific nightclubs, were both associated with syphilis infection ($p<0.05$). Sexual practices and condom use were not associated with syphilis infection. HIV co-infection rates were similar for cases (25%) and controls (23.7%). Cases were more knowledgeable about syphilis, answering 92% of knowledge questions correctly, versus 77% for controls ($p<0.05$).
Conclusions: Meeting partners at specific venues is associated with an increased risk for acquiring syphilis. Targeted educational and screening campaigns might reduce infection rates and improve early diagnosis and treatment of syphilis. High HIV rates among MSM with syphilis intensify concerns for the ongoing spread of HIV in this community.

Key words: syphilis, HIV, sexually transmitted disease, risk factor

P12. *Beth C. Tohill, A. Duerr*
How Do Common Methods of Diagnosing Bacterial Vaginosis Correlate with Microbiological Profiles?

Background: Bacterial vaginosis (BV) prevalence ranges from 10% (obstetrics/gynecology practices) to 64% (sexually transmitted disease clinics). BV increases women's risk for pelvic inflammatory disease and preterm delivery. Diagnosis is made by scoring Gram stains of vaginal flora (research standard) or clinical signs (practice standard). BV diagnosed by either method is microbiologically heterogeneous. To better

understand BV, we characterized specific microbiological profiles of both normal and abnormal vaginal flora and assessed risk factors for various abnormal profiles.
Methods: Data used were from a prospective study of 350 women who were HIV-uninfected and who had Gram stain data and clinical assessment at the same visit (n=3489 visits). Microbiological profiles were constructed based on Gram stain; multivariate models for risk factors accounted for repeated measures.
Results: Six profiles were identified: I (high *Lactobacillus*, low *Gardnerella*, no *Mobiluncus*); II (low *Lactobacillus*, low *Gardnerella*, no *Mobiluncus*); III (high *Lactobacillus*, high *Gardnerella*, no *Mobiluncus*); IV (high *Lactobacillus*, high *Gardnerella*, *Mobiluncus*); V (low *Lactobacillus*, high *Gardnerella*, no *Mobiluncus*); VI (low *Lactobacillus*, high *Gardnerella*, *Mobiluncus*). Logistic regression models compared each abnormal profile to profile I, normal vaginal flora. Risk factors identified included: age >45 (profile II, OR=3.7), African American race (profile V, OR=1.8; profile VI, OR=4.3), smoking (profile V, OR=1.5; profile VI, OR=2.1), male sex partner (profile II, OR=2.4; profile V, OR=1.7; profile VI, OR=1.5), female sex partner (profile VI, OR=3.0), and trichonomiasis (profile III, OR=7.4; profile IV, OR=5.6; profile V, OR=3.5; profile VI, OR=1.9).
Conclusions: The 6 profiles provide a series of microbiologically distinct categories describing vaginal flora; the comparison of the individual abnormal profiles with the normal profile may more clearly elucidate risk factors and outcomes.

Key words: bacterial vaginosis, genital infections, Gram stain, *Gardnerella*, *Lactobacillus*, *Mobiluncus*

P13. *Sidibe Kassim, L. Armstrong, P. Gargiullo, P. Wingo, I. Hall*
Invasive Cervical Cancer Among Hispanic and Non-Hispanic Women — United States, 1992-1998.

Background: Each year, about 5,000 women die of invasive cervical cancer in the United States, and 15,000 women learn they have the disease. Because of aggressive screening for precancerous lesions, incidence and deaths are decreasing overall. However, incidence remains high for some women, including Hispanics. We compared trends in invasive cervical cancer incidence among Hispanic and non-Hispanic women.
Methods: We analyzed data from Surveillance Epidemiology and End Results (SEER) cancer registries (1992-1998) using SEER*Stat 4.1. There were 12,983 microscopically confirmed cases of invasive cervical cancer. We determined incidence rates per 100,000 (age-adjusted to 1970 U.S standard population) and the estimated annual percent change (EAPC) among Hispanic and non-Hispanic women.
Results: From 1992 to 1998, 77% of invasive cervical cancer occurred among non-Hispanic women, 21% among Hispanic women, and 2% among women of unknown ethnicity. Incidence rates were 8.6 per 100,000 for all women, 7.6 for non-Hispanics, and 14.3 for Hispanics. During the 7-year period, rates decreased for all women: from 8.0 to 7.1 for non-Hispanics (EAPC= -1.8; 95% confidence interval [CI] = -3.2 -- -0.3) and from 16.5 to 12.1 for Hispanics (EAPC = -5.5; 95% CI = -7.7 -- -3.2). For non-Hispanic women >=30 years old, rates ranged from 10.6 in the 30--39-year age group to 15.8 in the 50--59-year age group. For Hispanics, rates ranged from 16.9 in the 30--39-year age group to 34.6 in the 60--69-year age group. Regardless of stage of cancer, rates for Hispanics were about twice that for non-Hispanics in all age groups.
Conclusions: These findings suggest that Hispanic women bear the burden of cervical cancer in SEER registry areas. They should be targeted more efficiently by early detection programs.

Key words: cervical cancer, incidence, ethnic groups, Hispanic, registries

P14. *Barna D. Tugwell, K. Hedberg, D. Shipley*
Evaluation of Melanoma Reporting — Oregon, 1996 –1999.

Background: In 2001, approximately 7,800 people in the United States died from melanoma. Effective prevention programs depend on accurate surveillance data. Most cancers are reported to the Oregon State Cancer Registry (OSCaR) by hospital-based registries. Cancers diagnosed primarily in the outpatient setting, such as melanoma, are reported by physician offices. One large Oregon health maintenance organization (HMO) has centralized access to all inpatient and outpatient diagnoses. To evaluate the

completeness of melanoma reporting, we compared the incidence and disease patterns in this HMO and non-HMO populations.
Methods: From the OSCaR database, we analyzed melanoma cases diagnosed during 1996-1999 for the five counties where 95% of this HMO population resides. Incidence rates were age-adjusted to the 2000 U.S. population standard.
Results: The invasive melanoma incidence in the HMO population (30.4 per 100,000) was nearly twice the incidence in the non-HMO population (16.7). Although the combined incidence of regional and distant disease was similar in both populations (1.3 per 100,000), the incidence of localized disease in the HMO population (28.5) was twice that of the non-HMO population (14.4). The median age at diagnosis of HMO patients (54 years) was similar to that of non-HMO patients (53 years). In both populations, the incidence in men was approximately 1.5 times that of women. The incidence of other major cancers was similar in the two populations.
Conclusions: The incidence of late-stage melanoma was similar in the two populations, so the higher incidence of local stage melanoma in the HMO population is likely due to more complete reporting of outpatient diagnoses, rather than a screening effect. Automation of outpatient reporting, such as electronic pathology result submission, should improve completeness.

Key words: melanoma, registries, program evaluation, Oregon

P15. *Jennifer C. Sabel, J. VanEenwyk*
Food Insecurity as a Risk Factor for Obesity — Washington, 1995 –1999.

Background: Obesity continues to increase among all segments of the population and regions of the country. In 2001, the Surgeon General reported that the total direct and indirect costs attributed to overweight and obesity were $117 billion in 2000. Several studies have reported that women who experience food insecurity were more likely to be overweight. The purpose of this study was to identify whether food insecurity was an important risk factor for obesity in Washington State.
Methods: During 1995–1999, the Washington State Behavioral Risk Factor Surveillance System asked 17,371 civilian, noninstitutionalized, English-speaking adults aged >18 years if they had experienced food insecurity. Experiencing food insecurity was defined as answering "yes" to the question "In the past 30 days, have you been concerned about having enough food for you or your family?" The survey also asked about other modifiable and nonmodifiable risk factors for obesity, including age, race, ethnicity, income, education, diet, and physical activity level. Adults were considered obese if their body mass index was ≥30. SUDAAN software was used to conduct logistic regressions to identify risk factors for obesity.
Results: Nineteen percent of respondents reported obesity (N=3,252). In the final multivariate model, those who reported food insecurity were 40% more likely to be obese (odds ratio=1.4, 95% confidence interval=1.1-1.9) when controlling for age, race, ethnicity, physical activity, and fruit and vegetable intake.
Conclusions: Washington men and women with food insecurity were more likely to be obese. If longitudinal studies determine that food insecurity increases risk of obesity, prevention might involve providing a continuous supply of nutritious foods in addition to standard nutrition and physical activity recommendations.

Key words: obesity, hunger, adult, risk factor

P16. *Judy Kruger, M. Serdula, D. Galuska, D. Jones*
Attempting to Lose Weight: Weight Loss Practices Among U.S. Adults.

Background: Americans spend over $33 billion annually on weight loss products and services. Although weight control methods are of considerable public health importance, little national data are available on specific weight loss practices. We examined the prevalence of specific weight loss practices among U.S. adults trying to lose weight.
Methods: We analyzed data from the 1998 National Health Interview Survey. Interviews were conducted through face-to-face interviews on a nationally representative sample of U.S. adults (n= 32,440). Analyses were performed using SUDAAN to account for the complex sampling design.
Results: Thirty-seven percent of women and 24% of men were trying to lose weight. Trying to lose weight was less common among normal weight (body mass index [BMI]<25 kg/m^2) persons (24% women,

6% men) than overweight (BMI≥25 kg/m^2) persons (53%, 35%). The most common strategies were eating fewer calories (63% women, 58% men), eating less fat (56%, 49%) and exercising more (52%, 54%). Less common strategies were skipping meals (9% women, 10% men), eating food supplements (6%, 5%) joining a weight loss program (6%, 3%), taking diet pills (3%, 1%), taking water pills (2%, 1%), or taking laxatives (0.4%, 0.02%).
Conclusions: Attempting weight loss is one of the most common health behaviors for U.S. adults, one in three of whom are trying to lose weight. Nevertheless, Americans are becoming heavier, with 60% currently overweight or obese. The safest and most effective method of losing weight is eating a balanced diet and being physically active.

Key words: weight control practices, overweight, obesity, diet, physical activity

Wednesday Afternoon — April 24, 2002

1:30 Bioterrorism-Associated Anthrax: Reports from the Field. Moderators: Bradley A. Perkins and Steven Wiersma

1:35 *Susan L. Lukacs, V. Hsu, S. Harper, T. Handzel, J. Hayslett, R. Khabbaz, A. Khan, A. Schuchat, C. Quinn, G. Martin, J. Eisold, R. Hajjeh, Washington, DC Anthrax Investigation Team*

Anthrax Outbreak Averted: Public Health Response to a Contaminated Envelope on Capitol Hill — Washington, DC, 2001.

Background: On October 15, 2001, a Senate staff member opened a business-size envelope containing a dried powder of *Bacillus anthracis* (BA) spores in a Senate office building. Within hours, chemoprophylaxis was initiated for persons present where the envelope was opened or areas sharing the same ventilation system (defined exposure area). Understanding extent of exposure from aerosolized spores and effectiveness of prevention measures is important due to the high mortality of inhalational anthrax.
Methods: To define exposure area, records were reviewed and persons present at the envelope opening were interviewed. On October 15-17, nasal swabs for BA culture were performed on persons from the building. Persons with positive cultures had swabs repeated and serial serologic evaluation to measure IgG antibodies to BA protective antigen (anti-PA).
Results: A total of 442 persons were identified in the defined exposure area. Of 2,172 persons tested, 28 had positive cultures: 13 (100%) of 13 persons working in the office where the envelope was opened, 5 (100%) of 5 first-responders to this office, 7 (28%) of 25 working in a connecting office, and 3 (11%) of 28 working in an adjacent office/hallway. Repeat swabs were negative at seven days, and nobody with positive cultures developed BA anti-PA antibodies by 42 days post-exposure. To date nobody has developed inhalational or cutaneous anthrax.
Conclusion: Early identification of BA in this envelope and immediate, wide chemoprophylaxis likely averted an outbreak of anthrax in this group. Nasal swabs, especially when performed within a few days of exposure, are helpful in assessing epidemiologic risk. Anti-PA antibody assay doesn't appear to be a sensitive measure of spore exposure. Close follow-up of this high-risk group is ongoing.

Key words: anthrax, spores, exposure, chemoprophylaxis

1:55 ***Bruce C. Tierney, P. Dewan, L. Broyles, A. Shane, J. Hayslett, K. Laserson, A. Fry, G. Curtis, T. Hales, C. Quinn, I. Walks, A. Khan, A. Schuchat, R. Khabbaz, R. Hajjeh, the Washington, DC Anthrax Investigation Team***

Inhalational Anthrax in a Postal Facility: Is It Possible to Assess Risk of Exposure? — Washington, DC, October 2001.

Background: During September-October 2001, envelopes containing *Bacillus anthracis* (BA) spores were sent to media and federal agencies through the United States postal system. Beginning October 20, 2001, 4 cases of inhalational anthrax (IA) occurred among employees at the Washington Processing and Distribution Center (PDC), representing the first cases of IA among postal workers. Since risk for IA was difficult to assess, all 2400 PDC workers were given prophylactic antibiotics when the first case was confirmed. We sought to better define the risk for IA to target further prevention efforts.

Methods: We obtained exposure histories, reviewed mail-processing procedures, and defined the course of the 2 contaminated envelopes processed through the PDC. To assess exposure, we collected environmental samples, nasal swabs, and, from a convenience sample of PDC workers, serum specimens to measure IgG antibodies to BA protective antigen.

Results: The attack rate for workers in the mail processing area was 4/1961 (0.2%); 2 case-patients worked along the route of the contaminated envelopes. Environmental sampling from this 500,000-square-foot facility demonstrated widespread contamination with BA. Nasal swabs from all 3110 workers and business visitors were negative. None of the 236 survey participants had clinically significant antibody titers.

Conclusions: Currently available epidemiological and environmental tools could not differentiate risk of IA following exposure to BA in this large PDC, where mail processing resulted in widespread aerosolization from heavily contaminated envelopes. Therefore it was necessary to promote adherence to antibiotic post-exposure prophylaxis among PDC workers. Ongoing research efforts to quantify aerosolization dynamics in these settings may help refine public health response to future events.

Key words: anthrax, inhalation, exposure, risk assessment, bioterrorism

2:15 ***Michael S. Phillips, C. Tan, J. Sejvar, C. Greene, the Anthrax Investigation Team***

Eleven Cases of Cutaneous Anthrax Infection Associated with Contaminated Mail — New York and New Jersey, October 2001.

Background: Potential bioterrorism by mail presents a challenging new threat to public health. Cutaneous anthrax in a person without previously described risk factors was identified in New York City on October 12, 2001.

Methods: After October 12, we established active surveillance of dermatology offices and hospitals, provided a 24-hour telephone hotline, and distributed frequent updates to the medical community. Our investigation of cases included case-patients interviews, review of medical records and testing clinical and environmental samples. Cases were classified as either suspected or confirmed by established CDC guidelines.

Results: Four suspected and seven confirmed cases were identified with onsets during September 20 – October 23 in NYC and New Jersey. Median age was 35 years (range: 0.6–51), and six (55%) were female. Only two case-patients had a single painless lesion with eschar and surrounding edema or induration on initial evaluation; among the remaining nine case-patients, features included edema (n = 9), vesicles (n = 5) and ulcers (n = 2). Anthrax was clinically diagnosed 10.3 days after initial examination in seven case-patients with an onset day before October 12, compared with 1.3 days for four case-patients with a later onset ($p < 0.001$). Case-patients visited a median of two healthcare providers (range: 1–4) before diagnosis. All case-patients had exposure to a workplace where environmental testing of a mail receiving or processing area demonstrated the presence of *Bacillus anthracis*. The most likely source of these exposures was intentionally contaminated mail.

Conclusions: Clinicians must be aware of the varying cutaneous manifestations of bioterrorist agents because a limited number of case-patients initially had a characteristic lesion. Educational outreach and enhanced surveillance methods were critical for a timely public health response.

Key words: bioterrorism, *Bacillus anthracis*, surveillance

2:35 ***J. Reefhuis, D. Valiante, D. Schill, M. Pierce, E. Bresnitz, the CDC New Jersey Investigation Team****

Letters from Trenton: Anthrax Investigation at the Source — New Jersey, 2001.

Background: The 2001 bioterrorist attack involving the mail system commanded the nation's attention and resources. At least four letters containing *Bacillus anthracis* were processed at the Trenton, NJ Processing and Distribution Center (P&DC); two on September 18, destined for New York City media outlets, and two on October 9, destined for U.S. Senators in Washington D.C. On October 18th a cutaneous anthrax case was confirmed in a postal worker at the P&DC, and the facility was closed.
Methods: Patients were interviewed regarding symptoms and possible exposures to *B. anthracis*. Industrial hygienists obtained environmental samples in the P&DC and local post offices which feed and receive mail from it. Work assignments were determined using time-clock records.
Results: Four cutaneous and two inhalational anthrax cases were identified. Four patients were hospitalized; none died. Onset dates occurred in two clusters: 9/20-9/27 (two cutaneous) and 10/14-10/18 (two cutaneous, two inhalational). Four case-patients worked at the P&DC; the remaining two case-patients handled or received mail processed there. Three of 122 persons working at the P&DC on October 9 developed anthrax (attack rate 2.5%); all worked in the letter sorting area. Of 125 environmental samples taken at the P&DC, 54 (43.2%) were positive for *B. anthracis*. Five (10%) of 50 local post offices produced a single positive sample, of 18-25 samples collected per facility. A total of 885 (82.8%) of 1069 P&DC employees for whom 60 days of antibiotic post-exposure prophylaxis was recommended received them.
Conclusions: Postal employees at a facility where *B. anthracis*-containing letters were processed developed cutaneous and inhalational anthrax. Cross-contaminated mail or equipment appears to have been the source of cutaneous anthrax cases and of focal contamination in related local post offices.

Key words: Anthrax, Bacillus Anthracis, bioterrorism, New Jersey, occupational exposure

The CDC New Jersey Investigation Team:
P.P. Abamonte, C. Alozie-Arole, G. Armstrong, M.J. Beach, B. Bell, S. Bruce, J. Buehler, G.A. Burr, S. Chamany, D. Crawford, D.R. Croft, C. Crowe, S.I. Davis, C. Dentinger, D. Deppe, M. Dott, L.A. Farrington, A. Fiore, M. Fraser, D.S. Friedman, J. Gardom, D. Gnesda, S. Goldstein, C. Greene, R. Helfand, B.C. Imhoff, G.J. Jones, R. Joskow, P. Kalluri, S.G. Kaufman, M. Kawamoto, M. Kennedy, J.D. King, S. McClure, M. McConnell, P.D. McElroy, K.R. Mead, R.L. Mickelsen, M. Patel, C. Pecoraro, R.W. Pinner, S. Redd, L. Roth-Edwards, H. Sandhu, M. Sells, C.G. Tan, N. Tucker, R. Varghese, D.J. Yereb, J. Zubieta.

2:55 ***Timothy H. Holtz, J. Ackelsberg, J. Kool, T. Matte, R. Rosselli, P. Thomas, J. Kornblum, T. Marfin, D. Dennis, D. Hewett, J. Harney, R. McCleery, M. Andre, S. Whitehead, W. Zhou, T. Sharpe, M. Ballesteros, N. Malakmadze, S. McMahon, M. Menon, C. Van Beneden, D. Feikin, M. Layton***

Inhalational Anthrax — New York City, October–November 2001.

Background: On October 31, 2001, a female aged 61years, who was a hospital employee from the Bronx, died of inhalation anthrax after a 6-day illness and before being interviewed. The New York City Department of Health and CDC conducted an investigation to determine sources of exposure and identify any additional persons at risk.
Methods: We conducted interviews of coworkers (n = 232), neighbors, and acquaintances (n = 35), and examined personal effects to reconstruct relevant details of the patient's activities during the 2 months before illness. Case-finding and surveillance near her home and at her workplace were conducted to detect additional cases. To identify the location where an aerosol exposure had occurred, we collected nasal swabs from coworkers and environmental samples with swabs and HEPA-vacuuming in and around her apartment and workplace, from selected personal effects, and from locations where she had visited recently. All specimens were cultured for *Bacillus anthracis*.
Results: The patient's job included handling supplies in the stockroom in which mail was sorted, but she did not handle mail. Large segments of the patient's reconstructed, premorbid time line remained unaccountable. No additional cases of cutaneous or inhalational anthrax were found. Nasal swabs of 28 coworkers were negative for *Bacillus anthracis*. All environmental samples were negative.

Conclusions: This was the first case of inhalational anthrax during the intentional 2001outbreak without an apparent direct link to contaminated mail. The route of exposure of this case of inhalational anthrax remains unknown. This case highlights the challenges in explaining isolated inhalational anthrax cases by using standard epidemiologic and environmental methods.

Key words: *Bacillus anthracis*, inhalational anthrax

3:15 ***Kevin S. Griffith, P. Mead, G. Armstrong, J. Painter, K. Kelley, D. Mayo, D. Barden, E. Teshale, J. Williams, J. Perz, D. Swerdlow, E. Mast, J. Hadler, for the Connecticut Anthrax Investigation Team***

Aftermath of Daschle-Leahy: Epidemiologic Investigation of a Case of Inhalational Anthrax — Connecticut, 2001.

Background: On November 19, 2001, a case of inhalational anthrax was identified in a 94-year-old woman from rural Connecticut. Unlike other recent bioterrorism-related cases, the patient had no known exposure to envelopes intentionally contaminated with *Bacillus anthracis*.
Methods: The patient's family and close contacts were interviewed. Samples from her home, all indoor air spaces she visited in the 60 days preceding her illness and regional postal processing facility were cultured for *B. anthracis*. First-class mail from known contaminated postal facilities was traced forward and all mail she received was traced backward for evidence of cross-contamination.
Results: None of 449 samples from the patient's home and related areas yielded *B. anthracis;* however, *B. anthracis* spores were recovered from four (31%) of 13 mail-sorting machines at the regional postal facility. One extensively contaminated machine handles approximately 75% bulk mail that cannot be traced to its recipient or point of origin. A second contaminated machine does final sorting for the patient's town. Of 52 columns of bins sampled on that machine, only the column for the patient's carrier route yielded *B. anthracis.* The patient received no first-class mail from other known contaminated facilities; however, approximately 80% of her mail was bulk mail.
Conclusions: Despite an extensive search, no environmental source or evidence of *B. anthracis* release in her community was identified. Evidence suggests that she was exposed through cross-contaminated mail. The investigation demonstrated that postal facilities and letters passing through them could be cross-contaminated with anthrax spores. The possible identification of cross-contaminated mail as the source of inhalational anthrax has implications for the safety of mail throughout the United States following bioterrorist attacks.

Key words: bioterrorism, *Bacillus anthracis,* anthrax, postal facilities

Thursday Morning — April 25, 2002

8:30 *Primum No Nocere*: Health-Care-Associated Illnesses. Moderator: Julie L. Gerberding

8:35 ***Dejana Selenic, K. Thom, M. Arduino, B. Jensen, D. Dodson, A. Panlilio, L. Archibald***

***Enterobacter cloacae* Bloodstream Infections Among a Pediatric Population Associated with Contaminated Ranitidine Infusate — Missouri, 2001.**

Background: *Enterobacter cloacae* have been implicated in several outbreaks of hospital-acquired bloodstream infections (BSI) due to contaminated intravenous (IV) infusates. Between February 12 and March 30, 2001, four patients in pediatric hospital A acquired *E. cloacae* BSI.
Methods: A case-patient was defined as any hospital A patient with a blood culture positive for *E. cloacae* during February 5-March 30, 2001. To identify risk factors for BSI, we first compared case-patients to randomly selected controls similar in age. Then we compared case-patients to randomly

selected controls who received IV ranitidine. We reviewed pharmacy and infection control practices, obtained personnel and environmental cultures, and performed pulsed-field gel electrophoresis (PFGE) on the isolates.

Results: Four case-patients were identified; one developed meningitis; none died. The median age of case-patients was 84 (range 54-123) days. Case-patients were more likely than controls to receive IV ranitidine (4/4 vs. 0/12, p<0.005). Among patients receiving IV ranitidine, case-patients were more likely than controls to receive IV ranitidine prepared by pharmacist A (3/4 vs. 0/7, p=0.02) or pharmacist B (4/4 vs. 2/7, p=0.04). No environmental or personnel cultures yielded *E. cloacae*. Patients' *E. cloacae* isolates had different PFGE patterns, suggesting environmental contamination. Assessment of pharmacy practices found that ranitidine multidose vials were kept for up to 48 hours at room temperature after first dose was drawn, contrary to the manufacturer's recommendations. Further, preparation of ranitidine infusates did not follow recommendations of the American Society of Health-System Pharmacists for preparing sterile IV products.

Conclusions: Our findings suggest that ranitidine multidose vials may have become contaminated due to improper storage and practices during preparation of ranitidine infusates. Significant patient harm may occur when pharmacy quality assurance measures are overlooked.

Key words: *Enterobacter cloacae*, intravenous, contamination, infant, bacteremia

8:55 ***Soju Chang, D. Selenic, M. Bell, P. Lurie, K. Nalluswami, C. Coventon, C. Schaben, J. Rankin, J. Hersh, D. Jernigan***

Adverse Events and Deaths Associated with Laboratory Errors at a Hospital — Philadelphia, 2001.

Background: Prothrombin time (PT) and international normalized ratio (INR) are laboratory values for monitoring blood coagulation in patients receiving warfarin, an anticoagulant drug with >8 million prescriptions in the United States in 1999. On July 25, 2001, personnel at a Philadelphia hospital recognized falsely-low INR reporting from its laboratory.

Methods: To find the root cause of the laboratory error and its impact on affected patients, we observed laboratory staff and processes, and compared characteristics of patients tested during the period when errors were reported (June 4-July 25, 2001; N=843) with a pre-error period (April 15-June 3, 2001; N=835). We evaluated a subgroup of patients from each period having at least one high (>3.0) INR, a level exceeding the usual therapeutic range, for possible associations between exposure to the error and adverse events.

Results: Insufficient quality control and incorrect programming of a laboratory information system (LIS) generated 2,384 falsely-low INRs in the error period. Patient demographic factors did not significantly differ between periods. For the high INR subgroups, the median PT (19.2 sec vs 16.8 sec, p<0.005) and true INRs (2.96 vs 2.32, p<0.005) were significantly higher in the error period. Patients exposed to the error were more likely to have bleeding complications (3/34 vs 36/80, p<0.005); three deaths from intracranial hemorrhage were attributed to the laboratory error.

Conclusions: Preventable errors due to inadequate laboratory quality control went unrecognized for seven weeks leading to adverse events and deaths. Laboratories should verify automated LIS calculations and clinicians should suspect laboratory errors when clinical presentations are discordant with PT/INR results.

Key words: Laboratory error, patient safety, warfarin, prothrombin time, international normalized ratio, adverse events

9:15 ***Thomas A. Clark, J. Morgan, M. Brandt, T. Lott, S. Slavinski, S. Taylor, H. Flowers, S. Fridkin, R. Hajjeh***

Hospital Outbreak of *Candida parapsilosis* Bloodstream Infections — Mississippi, 2001.

Background: *Candida parapsilosis* (Cp) commonly causes vascular catheter-associated bloodstream infection (BSI). During 2001, Hospital A, a large Mississippi community hospital, experienced a seven-fold increase in Cp BSI rates. To determine risk factors for infection and recommend control measures, we conducted a case-control study and environmental investigation.

Methods: Cases included all Hospital A inpatients during the study period (April 1-October 31, 2001) with a positive Cp blood culture obtained ≥48 hours after admission. Two controls per case were matched by age group, primary service, and length of hospitalization prior to the case culture. We observed health care worker (HCW) hand hygiene (HH) practices, and cultured HCW hands, catheter insertion sites and ports, and patient care devices. We performed molecular subtyping of Cp isolates using electrophoretic karyotyping and randomly amplified polymorphic DNA analysis.
Results: We identified 13 Cp BSI cases (median age 54 years, range 29-78; 69% male, 4 [31%] died). Factors associated with infection on univariate analysis included: APACHE II score, mechanical ventilation, multiple catheters, dialysis catheters, and total parenteral nutrition (TPN) ($p<0.05$); and on multivariate analysis: APACHE II score ≥18 (odds ratio [OR]=28.3, 95% confidence interval [CI]=2.4-334.8) and TPN (OR=1.1 per day, 95% CI=1.0-1.3). Before direct patient contact, nurses performed appropriate HH during 39% and physicians during 18% of observed HH opportunities. *Candida parapsilosis* grew from 18/69 pairs of HCW hands, 0/8 catheter insertion sites, 0/10 ports, and 1/16 devices. Preliminary subtyping revealed similar DNA fingerprints among 5/5 blood and 6/18 hand isolates.
Conclusions: Epidemiologic, observational and molecular data suggest colonized HCW hands and sub-optimal HH facilitated catheter colonization and subsequent infection in these severely ill patients. We recommended training HCWs on improving HH practices.

Key words: nosocomial infections, Candida, DNA fingerprinting, infection control, antisepsis

9:35 ***Anil A. Panackal, A. Dahlman, K. Keil, C. Peterson, S. Mirza, M. Phelan, B. Lasker, M. Bell, J. Carpenter, D. Warnock, R. Hajjeh, J. Morgan***

Outbreak of Invasive Aspergillosis Among Renal Transplant Recipients — Los Angeles, California, 2001.

Background: Invasive aspergillosis (IA), a highly fatal infection among immunosuppressed patients, is rare among renal transplant recipients (RTR). We investigated a cluster of IA among RTR in a Los Angeles hospital during January-February 2001 to determine risk factors for disease.
Methods: We conducted a retrospective cohort study among all RTR hospitalized during 1/1/01-2/5/01. Cases of IA were defined based on clinical and microbiologic criteria. An environmental investigation assessed ongoing construction activities and the hospital ventilation system. Clinical and environmental specimens were analyzed using DNA fingerprinting. Active surveillance for further cases was established.
Results: Four cases were detected among 40 RTR identified during the study period; three were male, median age was 44 years (range 33-55 years), and all died within 11 days following diagnosis. The median time from last transplantation till diagnosis of IA was 71.5 days (range: 58 to 415 days). On univariate analysis, factors significantly associated ($p< 0.05$) with increased risk of IA were: undergoing hemodialysis > 4 years prior to transplant, receiving corticosteroids > 40 days, and receiving sirolimus, a new immunosuppressant. The use of sirolimus with mycophenolate (another immunosuppressant) was associated with greater risk of IA (RR=39.0; 95%CI [5.34-inf.]). During construction activities, the hospital did not implement adequate environmental protection. Following this investigation, antifungal chemoprophylaxis was recommended for the higher risk patients, but until these recommendations were followed, three additional IA cases occurred; DNA fingerprinting revealed indistinguishable band patterns between two of these clinical isolates.
Conclusions: This outbreak is likely a result of exposure to *Aspergillus* occurring during hospital construction among severely immunosuppressed RTR. In addition to environmental protection, measures aimed at the host, such as chemoprophylaxis, may be useful in preventing IA.

Key words: invasive aspergillosis, renal transplantation, immunocompromised host, sirolimus, mycophenolate

9:55 ***David L. Kirschke, T. Jones, A. Craig, P. Chu, G. Mayernick, J. Patel, W. Schaffner***
***Pseudomonas aeruginosa* Associated with a Design Change in Specific Models of Bronchoscopes — Tennessee, 2001.**

Background: *Pseudomonas* species are commonly implicated in endoscope-related nosocomial outbreaks and can cause life-threatening illnesses. We investigated reports of *Pseudomonas aeruginosa* contamination of specimens obtained during bronchoscopy at a community hospital to determine the cause.
Methods: We reviewed hospital records of patients undergoing bronchoscopy at the community hospital during June-October 2001. Environmental samples were obtained from bronchoscopes and the hospital endoscopy suite. Pulsed-field gel electrophoresis (PFGE) was performed on isolates of *P. aeruginosa*.
Results: Two new bronchoscopes produced contaminated specimens on their second day of use. During the month that these bronchoscopes were used, bronchoscopy was performed on 32 patients. Among the 26 procedures performed with the new bronchoscopes, 18 (69%) produced specimens contaminated with *P. aeruginosa* versus none of six procedures performed with older models ($p<0.01$). One patient developed *P. aeruginosa* pneumonia 8 days after bronchoscopy. *P. aeruginosa* was cultured from a biopsy port of one of the new bronchoscopes before and after routine disinfection and from two sites in the endoscope reprocessing room. PFGE patterns of isolates from the bronchoscopes, patients, and environmental samples were indistinguishable. The caps of the biopsy ports on the implicated bronchoscopes were easily removed by investigators, despite information from the manufacturer indicating that they were permanently affixed. No contaminated specimens have been reported since use of these models was discontinued.
Conclusions: Environmental contamination within the endoscopy suite likely led to seeding of the bronchoscopes, which then contaminated specimens. A manufacturing design change allowed persistence of contamination in an area not readily amenable to disinfection. The manufacturer has issued a national recall of 15 different models of bronchoscopes to address the design problem and prevent further nosocomial infections.

Key words: endoscopes, cross infection, *Pseudomonas aeruginosa*, disinfection

10:15 ***Kevin L. Winthrop, H. Calvet, M. Yakrus, A. Kimura, S. Werner, D. Vugia***
Outbreak of *Mycobacterium chelonae* Keratitis Associated with LASIK Eye Surgery — California, 2001.

Background: Laser in-situ keratomileusis (LASIK) is the second most common surgical procedure in the United States. Although sporadic infectious complications are rare, outbreaks associated with LASIK have not been documented. In April 2001, we investigated a cluster of corneal infections from a single LASIK center in California.
Methods: We defined a case-patient as a person who developed a corneal infiltrate after undergoing LASIK at the surgical center during April. We reviewed records of all April LASIK procedures and observed the surgical procedure. Pulsed-field gel electrophoresis (PFGE) was performed on all clinical isolates. We cultured various items from the surgical suite and five contact lenses, obtained from the manufacturer, of the same lot used on case-patients during LASIK. Lenses also underwent polymerase chain reaction (PCR) testing. We e-mailed ophthalmologists nationwide asking for reports of recent mycobacterial keratitis.
Results: Four case-patients were identified; three had corneal cultures positive for *Mycobacterium chelonae* indistinguishable by PFGE. All infections were associated with LASIK correction of hyperopia (relative risk, undefined; $p<.001$) which, unlike myopic correction, utilized a soft contact lens. Lenses from a single manufacturer were used on all case-patients. Cultures and PCR of lenses were negative. Surgical observation failed to identify a mechanism for intraoperative contamination, and all environmental cultures were negative. Case-finding identified two additional unreported, but unrelated, mycobacterial outbreaks among LASIK patients.
Conclusion: This is the first reported outbreak related to LASIK. It was associated with hyperopic surgery using a soft contact lens, although the ultimate source of the outbreak remains unclear. The identification of two additional LASIK-associated mycobacterial outbreaks indicates atypical mycobacteria may be an emerging infectious challenge to this rapidly growing industry of elective eye surgery.

Key words: keratomileusis, laser in situ, atypical mycobacteria, outbreak, laser surgery, ophthalmology, keratitis

11:00 Violence Prevention. Moderator: Sue Binder

11:05 *Krista R. Biernath, M. Anderson, T. Simon, L. Paulozzi, S. Kegler*
Copycat Events on the Anniversary of the Incident at Columbine High School.

Background: On April 20, 1999, 15 people died at Columbine High School (CHS), Colorado in the most lethal incident of school-related violence in recent history. To determine whether violent events such as this generate "copycat" events, we examined actual and threatened events of school-associated violence during the weeks surrounding the one-year anniversary of the incident at CHS.
Methods: We defined a potential "copycat" event as any actual or threatened event of school-associated violence that occurred between March 20 and May 20, 2000 in the United States. Events were identified through a search of computerized media databases. We used Poisson regression models to evaluate time trends for all events. We also compared potential events and "definite" events (direct reference to CHS incident) planned for April 20, 2000 to those planned for any other date during the study period.
Results: During the study period, we identified 89 potential "copycat" events; 16 (18.0%) were definite events. Weekly event counts increased up to the week of April 20, 2000 ($p<.0001$) then decreased precipitously. Overall, the rate per 100,000 student-days was over thirty times higher for events planned to occur on April 20, 2000 than for those planned to occur on any other day during the study period (RR=32.0 [95%CI=20.3-50.5]). Fourteen (87.5%) of the sixteen definite events were planned for April 20, 2000.
Conclusions: These findings, which document increased "copycat" events around the one-year anniversary of the incident at CHS, may indicate a true phenomenon or represent an artifact of increased media attention. Responsible persons should be aware of the possibility of "copycat" events in preventing and responding to actual and threatened school-associated violent death events.

Key words: schools, violence, adolescence, imitative behavior

11:25 *Kathleen D. Askland, N. Sonnenfeld*
Suicide Attempts: Individual and Contextual Predictors — Maine, November 1999 –October 2000.

Background: Suicide attempts are potentially lethal events that have broad social consequences for the attempter, family and community. Understanding community-level determinants of suicide attempts is critical in targeting prevention efforts. We examined the association between socioeconomic context and suicide attempt rates in Maine towns.
Methods: To model the association between town-level socioeconomic context and suicide attempt rates, we used Poisson regression with generalized estimating equations while controlling for individual-level demographics. Suicide attempt rates were based on individual-level Emergency Medical System (EMS) data.
Results: Between November 1, 1999 and October 31, 2000, 1,056 suicide-related EMS responses for non-institutionalized residents were recorded in 275 (65%) Maine towns. Overall, poverty level (as measured by proportion of residents receiving food stamps), per capita income, population density and educational attainment were significantly and independently associated with suicide attempt rates. The effect of poverty level differed in higher- and lower-income towns. Suicide attempt rates increased by 11%-15% for every 1 percentage point increase in poverty level in higher-income towns, but by only 4% per percentage point increase in poverty in lower income towns. Suicide attempt rates also varied by population density in lower income towns, with the most rural communities having substantially lower suicide attempt rates.
Conclusions: These findings support an effect of socioeconomic context on suicide attempt rates in Maine. Suicide attempt rates increased more sharply with increasing poverty in higher-income than in lower-income towns, suggesting a possible independent effect of economic disparity on suicide attempt rates. If such findings are supported in future research, prevention efforts may be best targeted at socioeconomically disadvantaged communities and, especially, those with high levels of income inequality.

Key words: suicide, suicide attempt, context, socioeconomic

11:45 ***Barna D. Tugwell, K. Hedberg, D. Ngo, M. Kohn***
Suicidal Ideation Among Adult Medicaid Clients — Oregon, 1999.

Background: Oregon's suicide incidence is the ninth highest in the United States. State-funded programs, such as Medicaid, could allocate prevention resources most efficiently if subpopulations at highest risk were identified. Suicidal ideation (SI) may be a predictor of future attempts. We identified risk factors and target populations within Medicaid associated with SI.
Methods: In 1999, a behavioral risk factor survey was administered by telephone to a stratified random sample of 2,770 adult Oregon Medicaid clients. Comparisons with the general population were made using the 1999 Behavioral Risk Factor Surveillance System. Respondents were defined as having SI if they seriously considered attempting suicide the previous year.
Results: SI among the Medicaid population (7.6%, 95% Confidence Interval [CI]=6.6%-8.8%) was 2.5 times greater than SI among the general population (3.0%, 95% CI=2.5%-3.6%). Within Medicaid, 30.1% (95% CI=23.8%-37.3%) of persons with SI reported actually attempting suicide. SI among those in the Aid to Blind and Disabled (ABAD) program (15.3%, 95% CI=12.8%-18.3%) was 2.8 times that in other programs (5.5%, 95% CI=4.5%-6.7%). In a logistic regression model, SI was associated with illicit drug use (adjusted odds ratio [AOR]=2.6, 95% CI=1.9-3.5), unemployment for more than 1 year (AOR=2.5, 95% CI=1.7-3.5), poor health status (AOR=1.9, 95% CI=1.4-2.7), college education (AOR=1.7, 95% CI=1.2-2.4), current smoking (AOR=1.7, 95% CI=1.2-2.3), and divorce or separation (AOR=1.6, 95% CI=1.1-2.2), but not with age or gender. Identifying Medicaid clients who were in the ABAD program, had long-term unemployment, or used illicit drugs would account for 86% of those considering suicide.
Conclusions: SI is high among Medicaid clients. Prevention efforts should target clients in the ABAD program in addition to persons in other high-risk groups.

Key words: suicide, Oregon, Medicaid, risk factors

Wednesday–Thursday Poster Session

12:30 Poster Session No. 2 — Posters on Display

(see Wednesday schedule for list of presentations)

Thursday Afternoon — April 25, 2002

1:25 International Health. Moderator: Richard J. O'Brien

1:35 ***Lorna E. Thorpe, T. Frieden, G. Khatri, A. Chowdury, K. Laserson, C. Wells***
Seasonality of TB in India: Is it Real and Why is it Important?

Background: India accounts for 1/3 of the world's prevalent tuberculosis (TB) cases. Rapid expansion of the Revised National TB Control Program (RNTCP) began in 1993 and has brought effective TB control to more than 400 million persons. Concerns from India's TB program managers regarding seasonal shifts in patient burden and supply needs prompted a comprehensive seasonal trend analysis.
Methods: We examined seasonal trends using quarterly RNTCP TB case reports in three pilot districts with complete program coverage (population=3,000,000), and in an expanded sample of 54 districts with > 80% coverage (population=110,000,000). Annualized quarterly TB incidence rates were calculated using 2001 census figures and were examined by gender, age, region, and TB disease type. Seasonality was measured as the range in quarterly percent variation around the mean TB rate. Multivariate Poisson

regression was used to quantify the independent effects of season. Quarterly trends in clinic visits were examined to identify any health-seeking behavior artifacts.

Results: Strong seasonal trends in TB diagnoses were identified in both populations, with a peak in April-June and nadir in October-December. Total adjusted disparity between spring and winter TB rates was 21%. Seasonality was more prominent among pediatric and extrapulmonary cases (which usually arise from recent infection more than latent reactivation), suggesting seasonal variation in transmission. Geographically, seasonality was prominent in the North and East. No seasonality was seen in patient-visits to clinics.

Conclusions: Seasonality of TB in India was determined as real and likely to be related to transmission. State-specific seasonality has now been incorporated into the national drug procurement system to avoid stock-outs of TB drugs, and to prevent treatment interruptions that contribute to relapses and drug-resistent TB.

Key words: tuberculosis, seasonality, India, transmission

1:55 *Lisa J. Nelson, S. Bhatia, P. Cegielski*
Tuberculosis Among Tibetan Refugees — India, 1994 –1996.

Background: In 1959, approximately 80,000 Tibetans fled to India. From 1994 to 1996, the Tibetan Government-in-exile conducted a demographic and health survey of the refugee settlement population. Tuberculosis (TB) was the leading health problem. To estimate TB incidence and determine risk factors for TB in this population, we analyzed follow-up data through 1996.

Methods: We examined data from a house-to-house census of all Tibetans living in 37 refugee settlements throughout India, and an accompanying survey determined sociodemographic and health characteristics. At monthly follow-up visits, population changes, illnesses, and clinic visits were recorded. Quarterly reviews of clinic records verified TB cases.

Results: Among 47,791 persons surveyed (90% of the estimated Tibetan population in refugee settlements in India), 1197 TB cases were confirmed (incidence = 835/100,000). Significant risk factors for TB included male sex (RR=1.4; 95% CI 1.3,1.6), region of residence (South India RR=1.8; 95% CI 1.5, 2.1 and Central India RR=1.9; 95% CI 1.6, 2.4 vs. North), and occupation (farmers/animal husbandry RR=1.6; 95% CI 1.4, 1.9; sweater sellers RR=1.6; 95% CI 1.3, 2.0, and unemployed RR=2.6; 95% CI 1.8, 3.7 vs. students/teachers). Those ≥15 years were more likely to develop TB than children 0-14 (RR=2.7; 95% CI 2.3, 3.1). Tibetans born outside settlements in India had a lower TB risk than those born inside (RR=0.8; 95% CI 0.7-0.9). There was a significant association between length in settlements and TB risk (X^2 for trend, $p<0.05$).

Conclusions: TB incidence in Tibetan refugee settlements exceeds the highest national TB rates worldwide and is 10-fold higher than the Indian population. Efforts to implement directly observed therapy in India should include this population, especially demographic and occupational subgroups at highest risk.

Key words: tuberculosis, refugee, Tibet, India

2:15 *Sirenda Vong, J. Perz, Y. Hutin, J. Drobeniuc, B. Bell & 1998 International Field Epidemiology Course Participants*
Determinants of High Frequency of Therapeutic Injections — Chisinau, Republic of Moldova, 1998.

Background: In many countries where hepatitis B is highly endemic, overuse of therapeutic injections and unsafe practices account for a large proportion of infections. We conducted a population-based survey in Chisinau, Moldova, an area of high hepatitis B endemicity, to determine factors associated with receiving injections.

Methods: We sampled 704 households in 32 clusters in which one person ≥15 years was randomly selected and interviewed regarding frequency of injections received in the last 12 months and related knowledge, attitudes and practices.

Results: Of 700 persons interviewed, 385 (55%) had received ≥1 injection (median 10, range 1-720). Persons receiving injections were similar to those who did not in terms of age (median 44 vs. 41 years), sex (35% vs. 40% male), education (median 12 vs. 12 years), and awareness of hepatitis B and its

consequences (45% vs. 46%). Compared to persons not receiving injections, persons receiving them were more likely to report a preference for injections to treat colds (Odds Ratio [OR]=1.72, 95% Confidence Interval [CI]=1.15–2.57) or fever (OR=1.58, 95% CI=1.08–2.31), and to request injections when oral treatments were prescribed (OR=1.84, 95% CI=1.19–2.85). However, none of these preferences were reported by more than 30% of participants. Most participants reported knowing about risks from syringe reuse, but persons who received injections were less likely to have this knowledge (60% vs. 68%; OR=1.41, 95% CI=1.01–1.96).

Conclusions: Despite a general awareness of their potential for bloodborne pathogen transmission, therapeutic injections were common among Chisinau residents. However, a minority of them reported attitudes favorable to injection use. Interventions to decrease injection overuse should include promoting alternative modes of therapy to both health care providers and the public.

Key words: injection, Moldova, knowledge, attitudes, practices, hepatitis B

2:35 ***Jane M. Kelly, S. Rowe, B. Osamba, A. Rowe, M. Deming***

Determinants of Clinical Performance Among Community Health Workers — Siaya District, Kenya, February –March 2001.

Background: As part of a community-based project to reduce childhood mortality rates in Siaya District, Kenya, CARE/Kenya trained community health workers (CHWs) to use a clinical algorithm to manage illnesses contributing to high childhood mortality. Evaluations of CHW performance showed deficiencies in clinical skills. We studied the determinants of recommended treatment of malaria (defined by fever without signs of severe disease or measles) to provide guidance for program improvement.

Methods: Randomly selected CHWs were observed performing consultations with ill children <5 years who were then re-examined by an expert clinician. We examined data from CHW interviews, consultation documentation, observer checklists, caretaker interviews, and the expert clinician's re-examination with a series of univariate logistic regression models and a multivariate analysis of those variables with a $p<0.15$.

Results: Altogether, 149 children with malaria were seen by 103 CHWs, and 60.5% of the children received recommended treatment. Statistically significant determinants were: CHW self-reported use of a job-aid flipchart (odds ratio [OR] = 1.7, 95% confidence interval [CI]: 1.1, 2.7), increasing number of disease classifications present (OR = 0.5, 95% CI: 0.3, 0.9), and the CHW opinion that village women had a strong influence in their selection (OR = 0.4, 95% CI: 0.2, 0.9). CHW experience (e.g., number of children examined in the previous month), CHW education, and the number and duration of supervisory visits were not statistically significant factors.

Conclusions: We found no evidence that supervisory visits have been effective in improving the treatment of children with fever. Our results suggest they might become effective if supervisors focus on increasing the use of flipcharts and ensuring that febrile children are treated for malaria when fever is not the only symptom.

Key words: Village health worker, Kenya, quality of health care, epidemiologic determinants, clinical skills, malaria.

2:55 ***Thomas R. Handzel, D. Karanja, D. Addiss, A. Hightower, D. Colley, L. Slutsker, W. Secor***

Geographic Determinants of *Schistosoma mansoni* Infections as a Means of Prioritizing Communities for Mass Treatment of Children — Western Kenya, 2001.

Background: Schistosomiasis and geohelminth infections are important causes of morbidity in school-aged children in developing countries. The World Health Organization recommends mass treatment of children in schools where the prevalence of Schistosomiasis is >20%. However, testing of stools is often not feasible and little is known about geographic or other predictors for these infections.

Methods: To optimize strategies for mass treatment in western Kenya, we conducted a random survey of 1238 children aged 10-12 in 32 primary schools near Lake Victoria. Stool and urine were collected and tested for *Schistosoma mansoni*, *S. haematobium* and geohelminths. Exposure to surface waters was assessed with a questionnaire. Houses, schools and water sources were mapped using a geographic information system.

Results: Mean school prevalence of *S. mansoni* infection was 16.3% (range: 0 - 80%). Distance to the lake (r=0.89, p < 0.001) and contact with lake water were associated with infection as were specific water-related activities including swimming (Odds Ratio [OR]=4.8; 95% confidence interval [CI]=3.5, 6.7) and collecting water (OR=5.5; 95% CI=3.9, 7.6). All schools with an infection prevalence of >20% were within 4 km of the lakeshore; schools beyond 4km had a mean prevalence of 5.7% (range 0-17.1%). Sixty-three percent of students were infected with one or more geohelminths; prevalence was 42%, 22.3%, and 17.9% for hookworms, *Ascaris,* and *Trichuris,* respectively.
Conclusions: Schistosomiasis and geohelminth infections are common in this area, and schistosomiasis is strongly associated with proximity to Lake Victoria. We therefore recommend a targeted drug distribution strategy for communities in this area: treatment of all school-children for geohelminths and treatment of all children living within 4 km of Lake Victoria for both geohelminths and schistosomiasis.

Key words: schistosomiasis, helminthiasis, geographic factors, Kenya

3:30 Child and Adolescent Health. Moderator: Andrew R. Pelletier

3:35 *Michael F. Ballesteros, R. Schieber, J. Gilchrist*
Differences Between Causes of Fatal versus Non-fatal Injuries Among American Children, Using the CDC Web-based Injury Statistics Query and Reporting System (WISQARS).

Background: Injuries are the leading cause of death among children ages one through 14. Although leading causes of injury mortality are well defined, until recently no comprehensive annual surveillance of non-fatal injuries existed. We used a new surveillance system to compare pediatric injury-related emergency department visits (IEDV) and deaths.
Methods: The causes of injury mortality among children ages one through 14 were obtained from the 1998 National Vital Statistics System and were compared with morbidity data from the National Electronic Injury Surveillance System—All Injury Program. The latter, begun in July 2000, is a national probability sample of non-fatal IEDV, from which we weighted and annualized the first six months of data. All data were obtained from WISQARS, a new CDC web-based interactive platform.
Results: The 58.5 million children in the United States were associated with an estimated 7.2 million IEDV (based on 72,000 records) and 7,500 injury deaths, an overall non-fatal to fatal ratio (NF:F) of 960 IEDV:1 death. Among deaths, the three leading causes were motor vehicle crashes (n=2,568), drownings (n=1,058), and suffocations (n=968). Their respective NF:F were 210:1, 7:1, and 14:1. Firearms injuries, which caused only 612 deaths, were the most lethal (NF:F=4:1). Among non-fatal injuries, falls (n=2,400,000), struck by/against (n=1,800,000), and bites/stings (n=500,000) accounted for two-thirds of all IEDV; however, these causes were substantially less lethal, with NF:F=19,000:1, 21,000:1, and 42,000:1, respectively.
Conclusions: The leading causes of IEDV were not associated with high deaths rates. Injury prevention priorities historically have been based on mortality data, without sufficient consideration of non-fatal events. These new surveillance data indicate the need for research and programs on childhood fall prevention and other common, non-fatal injuries.

Key words: injury, pediatrics, emergency medical care, mortality

3:55 *Rachel Nonkin Avchen, C. Mervis, M. Yeargin-Allsopp*
Prevalence of Mental Retardation in Children Aged 6 – 10 Years — Atlanta, GA 1991 –1994.

Background: Children with mental retardation (MR) require special medical and educational services throughout their lifespan. Lifetime incremental costs and productivity losses for MR are estimated as $900,000 per person in current US dollars. Documented prevalence estimates vary given differences in operational definitions, methods of ascertainment, and/or study populations. The purpose of this study is to address these limitations.
Methods: We utilized the Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP), an active population-based surveillance system, to investigate the prevalence of children with MR from 1991-1994. Approximately 650,000 children 6-10 years lived in this large, multiracial area

during the study period, and 3778 children with MR were identified. This age range was targeted as most children with cognitive impairments are identified by school age. MR was determined from the most recent psychometric test score and was defined as mild (IQ 50-70) or severe (IQ < 50).
Results: The prevalence of MR was 12.0/1,000. Mild MR was evident for 65% of the cases. Prevalence of both mild and severe MR differed significantly by both sex and race, with males having 1.5 times the MR prevalence of females and Black children having 2.4 times the prevalence of MR as White children . Co-existing disabilities were observed in 7% and 34% of the children with mild and severe MR, respectively.
Conclusions: Our study found a slightly higher prevalence than an earlier study in metropolitan Atlanta (1985-1987). Yet, fluctuations in MR prevalence estimates are complicated to interpret especially when sex- and race- specific rates suggest socioeconomic confounding. Continued surveillance of this population should provide empirical evidence to accurately detect trends and provide insight into secular influences or anomalies, which may lead to prevention opportunities.

Key words: mental retardation, surveillance, prevalence

4:15 *Alcia A. Williams, H. Saltmarsh, N. Martin, A. Pelletier*
Oral Health Survey of Third Grade Students — New Hampshire, 2001.

Background: Dental caries is the most common chronic disease of childhood despite prevention measures such as fluoridation and the use of dental sealants. *Healthy People 2010* objectives are to reduce the proportion of children age 6-8 years with a history of dental decay to 42%, reduce untreated decay to 21%, and to increase the proportion of children aged 8 years with dental sealants to 50%. We conducted a statewide assessment of the oral health status of children in New Hampshire to establish a baseline for monitoring progress toward these objectives. Currently, only 43% of persons on a public water supply in New Hampshire receive fluoridated water.
Methods: Public elementary schools were selected with probability proportional to third grade enrollment size. A third grade class in each school was selected randomly; all students were eligible to participate. Children with parental consent received a brief noninvasive oral screening from February through April 2001.
Results: We screened 410 students in 26 schools. Overall participation rate was 78%. Ninety-nine percent of children were 8 or 9 years of age; 50% were female. Fifty-two percent (95% confidence interval (CI)=45.4%–58.5%) of children had a history of dental caries, 21.7% (95% CI=14.9%–28.5%) had untreated decay, and 45.9% (95% CI=39.7%–52.0%) had a dental sealant on ≥1 permanent molar. Among children screened, 69.8% (95% CI=63.1%–76.4%) had no obvious dental problems, 25.1% (95% CI=19.5%–30.8%) required early care, and 5.1% (95% CI=2.6%–7.6%) required urgent care.
Conclusions: New Hampshire is approaching the 2010 targets for 2 of 3 oral health objectives involving children. Continued efforts to expand dental sealant use and promote water fluoridation are needed to decrease the amount of dental decay.

Key words: dental caries, oral health, sealants

4:35 *Sharon Durousseau, G. Chavez, K. Marchi.*
Contraception Use and Barriers to Contraception Use Among Teen Mothers With Unintended Pregnancy — California 1999 and 2000.

Background: Over 50,000 California teens give birth annually. Teen pregnancy can result in lower academic attainment and adverse pregnancy outcomes. Because contraception plays an important role in teen pregnancy prevention, we examined contraception use and barriers to contraception use among teen mothers with unintended pregnancies.

Methods: We analyzed data from a population-based survey of California mothers aged ≥15 years delivering live births in 1999 and 2000 (N=7,044). "Teens" were aged 15-19 years and "adults" aged >19 years. Mothers were asked about pregnancy intention, contraception use and barriers to use before pregnancy. Among mothers with unintended pregnancies, we examined the association of teen age with using contraception and reporting various barriers to using contraception.
Results: Among those with unintended pregnancies, 61% of teens were not using contraception when they conceived compared with 54% of adults (relative risk (RR) 1.1 95% confidence intervals (CI) 1.1, 1.2). Common barriers to using contraception reported by teens included: "didn't think I could become pregnant" (39%) and "didn't want …side effects" (37%). Teens cited "didn't plan …sex" as a barrier more often than adults did (32% vs. 22% RR 1.8 95% CI 1.6, 2.2).
Conclusions: Teens with unintended pregnancy were more likely to not have been using contraception when they conceived than adults with unintended pregnancy. Teens cited "thinking they could not become pregnant" and "concerns about side effects" as barriers to contraception use most often, but cited unplanned sex as a barrier more often than adults did. Improving family planning education, addressing concerns about side effects of contraception, and addressing the unplanned aspect of teen sexual encounters may lower barriers to contraception use that teenagers experience.

Key words: pregnancy in adolescence, contraception, pregnancy unwanted, adolescent behavior.

Friday Morning — April 26, 2002

8:30 Worker Safety: Lessons from Anthrax Investigation. Moderator: Scott D. Deitchman

8:35 *Eyasu H. Teshale, J. Painter, G. Burr, R. Collins, R. Zabrocki, S. Wright, L. Cseh, K. Kelly, J. Hadler, D. Swerdlow*
Environmental Testing for *Bacillus anthracis* Spores in a Postal Facility: the Connecticut Experience.

Introduction: On November 11, 2001, as part of a national survey following the bioterrorism-related anthrax attacks, the U.S. Postal Service sampled the Southern Connecticut Processing and Distribution Center (SCP&DC); all samples were negative for *Bacillus anthracis (BA)*. Subsequent to the death of a resident of Connecticut from inhalational anthrax (IA) the SCP&DC was extensively re-sampled: we describe the methodology and national public health implications.
Methods: On November 11, the SCP&DC was sampled using dry swabs; on November 21 it was again sampled as part of the investigation using dry swabs and on November 25 using wet swabs. On November 28 more extensive testing was conducted using vacuum sampling and wet wipes guided by epidemiologic data.
Results: Overall, 53, 64, and 60 swab samples taken on November 11, 21, and 25 respectively were negative for *BA.* Of the 212 samples taken from four machines on November 28, six (3%) were positive (two vacuum and four wet wipes), including a highly contaminated sorting machine ($5.5x10^6$ CFU/gm) that could have provided the primary sort for the patient's mail. On follow-up sampling of 52 bin-columns from the final sorting machine for her region, only the column for her carrier route yielded *BA*. These results provided a possible link between the IA patient and mail, led to the revision of post-exposure prophylaxis recommendations for >1000 workers, and raised concern about the methods used in previously surveyed facilities.
Conclusions: Our investigation suggests that vacuum and wet wipe sampling for BA guided by epidemiologic data may be more sensitive than previously used methods. Since early detection of *BA* is essential to prompt rapid public health action, determining optimal strategies and methods for environmental sampling is crucial.

Key words: environmental sampling, bioterrorism, inhalational anthrax, postal facility, *Bacillus Anthracis*

8:55 ***Peter M. Dull, K. Wilson, C. Boulet, J. Ho, J. Ogston, B. Kournikakis, M. Spence, M. MacKenzie, E. Whitney, M. Phelan, T. Popovic, D. Ashford***

Risk of Re-Aerosolization of *Bacillus anthracis* Spores in a Mail Facility Associated with a Contaminated Sorting Machine.

Background: On October 12, 2001, at least two envelopes containing *Bacillus anthracis* spores passed through a Delivery Bar-Code Sorter (DBCS) machine in a postal facility in Washington, D.C. When anthrax was identified in postal workers 9 days later, the facility was closed. Surface sampling of this machine found it to be contaminated on October 24 but air sampling while the machine was inactive was negative. Our study objective was to determine to what extent an activated, contaminated mail-sorting machine might represent an ongoing risk of aerosolization of *B. anthracis* spores.
Methods: We collected surface samples on the machine to verify its contamination. To test for aerosolization, we performed continuous air sampling while the machine was inactive and during processing of uncontaminated mail.
Results: Nine of 10 (90%) surface samples were positive for *B. anthracis* spores. One colony forming unit (cfu) of *B. anthracis* was isolated from 990 liters of air (0.0010 agent-containing particles per liter (ACPL)) sampled prior to machine activation. Six cfu were isolated (from 990 L) during machine activation (0.0061 ACPL, $p = 0.06$). Assuming a normal adult minute ventilation (10 liters/minute), during an 8-hour shift, a worker might be expected to inhale ~29 *B. anthracis*-containing particles around this machine.
Conclusions: Aerosolized *B. anthracis* spores could be detected at low levels around an activated, contaminated DBCS machine in a postal environment, at a level likely above background. It is not known what risk this represents to postal workers but it is ~20–fold less than estimates of the numbers of routinely inhaled sub-5 micron *B. anthracis*-containing particles in studies of asymptomatic, unvaccinated goat-hair millworkers.

Key words: anthrax, *Bacillus anthracis*, occupational monitoring, environmental microbiology

9:15 ***Mariaelena D. Jefferds, S. Roy, J. Hayslett, A. Fry, K. Laserson, A. Schuchat, the Anthrax Adherence Team***

Promoting Postal Workers' Adherence to Antibiotic Prophylaxis to Prevent Inhalational Anthrax — Washington, DC, 2001.

Background: On October 12, 2001, at least two envelopes containing *Bacillus anthracis* spores were processed through the Brentwood Mail Facility, Washington, DC. Four mail workers developed inhalational anthrax; two died. The facility was closed October 21, 2001, and approximately 2,400 postal workers and business visitors to the private employee work area were advised to complete 60 days of antibiotic prophylaxis to prevent inhalational anthrax. Adherence to the full course of antibiotics was of great public health concern. Through repeated visits to displaced Brentwood workers, we learned about issues that promoted and limited adherence and developed multiple interventions to promote adherence throughout the 60 days.
Methods: At the end of the prophylaxis period, we evaluated the effectiveness of the interventions and assessed factors promoting and limiting adherence. We collected quantitative information in face-to-face surveys with a convenience sample of 250 Brentwood workers and qualitative information in one-on-one and focus group interviews with 60 workers.
Results: Preliminary results indicate that interventions, especially frequent visits, were effective in promoting adherence. Even with these interventions, 57 (23%) of 250 people surveyed stopped taking antibiotics. Of those people, 35% thought they were at high risk of having inhaled spores. One-on-one and focus group interviews confirmed that workers did not fully understand the risks of not taking antibiotics as prescribed, were confused by inconsistent information, and had limited ability to complete the regimen because of stress associated with the crisis (e.g., mourning, feeling unsafe at work).
Conclusions: Promoting adherence is critically important when prophylactic antibiotics are required after exposure to *B. anthracis* spores. One-on-one and small group discussions should be offered repeatedly to reinforce accurate information about anthrax and antibiotics.

Key words: adherence, anthrax, prophylactic antibiotics, health education

9:35 ***Jennifer L. Williams, S. Noviello, H. Wurtzel, K. Griffith, J. Hamborsky, J. Perz, I. Williams, J. Hadler, D. Swerdlow, R. Ridzon***

Anthrax Post-Exposure Prophylaxis Adherence Among Postal Workers — Connecticut, 2001.

Background: Post exposure prophylaxis (PEP) is the prevention effort cornerstone of postal workers (PWs) with potential anthrax exposures; however, noncompliance has been a significant problem. On 11/20/01, a Connecticut woman was diagnosed with inhalational anthrax. PEP was recommended for the 1122 PWs at the regional mail facility serving the patient's area. The facility's initial environmental testing was negative; subsequent testing confirmed the presence of *B. anthracis*. Our purpose was to evaluate the extent of compliance among PWs and identify barriers to PEP.

Methods: Standardized questionnaires were administered within 20 days of initial PEP clinics to 100 randomly selected PWs. Demographics, antibiotic use, adverse events, attitudes regarding PEP and exposure risk were evaluated.

Results: The majority of employees were male (66%), and white (71%) with a mean age of 45 years. 94 PWs picked up antibiotics; 80% received ciprofloxacin, 19% doxycycline and 1% amoxicillin. Of the 68 (72%) PWs starting PEP, 21 (31%) discontinued (mean PEP duration=6 days). The 53 postal workers who stopped or never initiated PEP cited disbelief regarding anthrax exposure (32%), concerns or problems with adverse events (21%) and initial reports of negative environmental cultures (13%). Adverse events were reported by similar proportions of PWs treated with ciprofloxacin (42%) and doxycycline (38%). Among the 36 PWs who reported adverse events, predominant symptoms were gastrointestinal distress (72%) and headache (25%). Four PWs attributed work absence (mean duration=1 day) to adverse events.

Conclusions: PEP adherence was influenced by PWs' perceived low risk of exposure and concerns about adverse events. In the future, communication about risks of acquiring anthrax, education about adverse events and management of adverse events will be essential components to increasing PEP adherence.

Key words: anthrax, bioterrorism, *B. anthracis*, Connecticut

Friday Afternoon — April 26, 2002

1:15 Outbreaks of Foodborne Disease... or Not? Moderator: Paul A. Blake

1:20 ***Donita R. Croft, J. Archer, C. Roberts, R. Johnson, T. Monson, D. Lucas, T. Kurzynski, D. Hoang-Johnson, L. Machmueller, L. Kelly, D. Crossfield, G. Rosario, C. Kaspar, J. Crump, J. Davis***

Outbreak of *Escherichia coli* O157:H7 Infections Associated with a Pancake Breakfast Served in a Stock Pavilion with Contaminated Livestock Bedding — Wisconsin, 2001.

Background: Outbreaks of *Escherichia coli* O157:H7 (O157) infections associated with livestock contact at petting zoos and county fairs have resulted in substantial morbidity. O157 can survive and grow in livestock bedding. An outbreak of O157 infections occurred following an October 6, 2001 pancake breakfast at a university stock pavilion, which was used for many activities including livestock classes.

Methods: We conducted a case-control study using friend controls to investigate the association between illness, food consumption, and other activities. Case-patients were defined as persons who ate at the pavilion on October 6, and within 7 days had onset of diarrhea and nausea, vomiting, or abdominal cramps. Environmental samples and human and cattle fecal specimens were cultured for enteric pathogens. Pulsed field gel electrophoresis (PFGE) was performed on O157 isolates.

Results: Among approximately 1000 breakfast attendees, 34 (3%) met case-patient definition. Case-patients waited longer in line for breakfast than controls (mean time 19 and 9 minutes, respectively;

p<0.0001). Five dairy cows had been housed in the pavilion during October 3-4; visible manure was removed from the sawdust bedding covering the floor. No livestock were present during the breakfast. O157 was cultured from fecal specimens from 16 (100%) tested case-patients and one (20%) cow. O157 isolated from sawdust samples obtained 11 and 30 days after the breakfast were indistinguishable by PFGE from the human and cow isolates.

Conclusions: O157 was likely transmitted by direct and indirect contact with contaminated livestock bedding while the case-patients waited for and ate breakfast. O157 can survive in animal bedding and be infectious to humans even when animals are not present. Recommendations were made to discontinue food preparation and consumption in the pavilion.

Key words: *Escherichia coli* O157:H7, livestock, disease outbreaks, diarrhea, animal housing, zoonoses

1:40 ***Gaston Djomand, M. Goldoft, P. Waller, M. Ferluga, R. Pallipamu, D. Eaton, V. Davis, J. Hofmann***

Outbreak of *Escherichia coli* O157:H7 Infection Associated with Pears — Washington State, 2001.

Background: *E. coli* O157:H7 causes an estimated 73,000 infections annually in the United States, with 68% of outbreak-associated infections occurring via food- or waterborne transmission. In October 2001, we investigated an outbreak of *E. coli* O157:H7 among students at a Washington college.

Methods: An unmatched case-control study was conducted to identify risk factors for infection. Cases were defined as illness occurring in college students or staff who had a diarrheal illness lasting ≥72 hours, having onset September 14 to October 1, 2001; cases were confirmed if *E. coli* O157:H7 was isolated from stool. Controls were selected from friends or acquaintances of cases. Pulsed-field gel electrophoresis (PFGE) was performed on isolates.

Results: Fourteen cases were identified: six confirmed and eight probable. Median age was 20 years (range:17-25 years), 9 (64%) were female, and 10 (71%) were students. There were no hospitalizations or deaths. Six case-patients had similar *E. coli* O157:H7 patterns by PFGE. Nine cases (64%) versus 22% of controls consumed whole pears at a college dining hall (odds ratio=6.0; 95% confidence interval=1.4-27; p<0.01). No evidence of contamination with ruminant feces was identified at the orchard. However, the index case, a foodhandler who served pears and other foods bare handed, worked for 14 days with diarrhea. The index case had no *E. coli* O157:H7 isolated from stool; however, a serum specimen obtained 14 days after onset indicated the presence of verotoxin antibodies.

Conclusions: An *E. coli* O157:H7 outbreak was associated with consumption of whole pears prepared by a foodhandler with a recent history of diarrhea. This outbreak highlights the importance of minimizing bare-hand contact of ready-to-eat foods and excluding from work foodhandlers with diarrheal illnesses.

Key words: *Escherichia coli* O157-H7, outbreak, pears, foodhandler

2:00 ***Lisa M. Brown, D. Kim, J. Courtney***

Lead Poisoning Associated with Imported Mexican Candies — California, 2001.

Background: Elevated blood lead levels (EBLLs ≥10 µg/dL) in children aged < 6 years are associated with impaired neurobehavioral development. Important lead sources along the U.S./Mexican border include trans-border movement of lead-containing traditional medicine, pottery and candies. In 2000, routine lead screening at Long Beach Medical Center in California identified three lead-poisoned children. All had eaten candy imported from Mexico with wrappers containing high lead concentrations (21,000 µg/g). We evaluated the association between eating imported candy and EBLLs in other children tested at the Center.

Methods: Using Center data, we identified children tested during January 2000-July 2001. We interviewed 69 cases (BLL ≥ 10 µg/dL) and 87 controls (BLL < 6µg/dL) to assess risk factors for lead exposure and candy exposure (defined as eating lead-contaminated candy in the month before test date). Conditional logistic regression was conducted on 49 cases matched to 72 controls by age, sex, and zip code.

Results: 22.5% of cases and 22.2% of controls ate contaminated candy in the month before the test. EBLLs were associated with foreign residence in the year before test date (OR 4.63; 95% CI 1.27-16.89); and use of imported pottery (OR 4.56; 95% CI 1.26-16.57). The matched odds ratio (OR) for an EBLL

among children eating candy was 1.13 (95% Confidence Interval [CI] 0.29-1.97). Introduction into the model of the variable foreign residence or use of foreign pottery did not significantly affect the OR.
Conclusions: Although exposure prevalence was high, consumption of lead-contaminated candies was not significantly associated with lead poisoning in this population. Prevention efforts should be expanded to address exposures acquired in Mexico and through imported products.

Key words: lead, child, candy, risk factors

2:20 ***Tom M. Chiller, M. Huddle, A. Gupta, L. Wolfe, D. Briggs, F. Virgin, R. Ahmed, J.. Maillard, C. Braden***

***Salmonella* Enteritidis on the Rise? Investigation of a Statewide Egg-Associated Outbreak — North Carolina, 2001.**

Background: The last decade saw a dramatic decrease in rates of *Salmonella* Enteritidis (SE) illness, but there has been a 15% increase in 2000. While many control measures aimed at the reduction of SE illness due to eggs have been implemented, other key measures, such as on-farm SE monitoring, remain variable, voluntary and local. In June-August, 2001, North Carolina experienced a five-fold increase in SE illness statewide.
Methods: A case-control study was performed. A case was defined as culture-confirmed SE in a resident of North Carolina from July 1 to September 7, 2001. One to two neighbor controls were matched to each case. SE isolates were subtyped by pulsed-field gel electrophoresis (PFGE) and phage-typing. Results were compared to a prior SE outbreak in South Carolina in February 2001.
Results: SE was isolated from 113 patients in North Carolina in June-August, 2001. Analysis of 53 patients and 78 controls showed illness was associated with eating eggs (matched odds ratio [MOR] 2.79; 95% confidence interval [CI] 1.11-9.52). Isolates from 21 (40%) of 53 patients had PFGE pattern A. Analysis restricted to patients with pattern A showed a stronger association with egg consumption (MOR 10.73; CI 1.30-88.81). PFGE pattern A was also identified in isolates from patients in the South Carolina SE outbreak. Isolates from SE patients in both outbreaks also shared a common phage-type
Conclusions: The recent increase in SE cases in North Carolina represents a widespread outbreak due to the consumption of eggs. Molecular characterization suggests a link to a preceding South Carolina outbreak. This highlights the importance of reinforcing current farm-to-table prevention efforts including participation in on-farm SE monitoring programs.

Key words: *Salmonella* Enteritidis, pulsed-field gel electrophoresis, outbreak

2:40 ***Pavani Kalluri, B. Walsh, C. Crowe, M. Reller, L. Gaul, J. Hayslett, J. Perdue, S. Barth, J. Zoretic, K. Holt, K. Hendricks, J. Sobel***

Dangers of Discounted Food: Outbreak of Botulism from Food Sold at a Salvage Food Store, Texas — August 2001.

Background: Foodborne botulism, a potentially fatal paralytic illness, is caused by potent neurotoxins elaborated by *Clostridium botulinum* in mishandled foods. We investigated the largest US outbreak of foodborne botulism in seven years, which primarily affected attendees at a church supper.
Methods: We conducted a cohort study of supper attendees and defined a case of botulism as cranial neuropathy, gastrointestinal illness, or laboratory-confirmed intoxication. We investigated the salvage food store where implicated foods were purchased.
Results: Fourteen cases of botulism were identified among 38 church supper attendees. The median age was 45 years (range 3-78). Nine (64.3%) were hospitalized and five (34.7%) required mechanical ventilation. Six patients had laboratory-confirmed type A botulinum toxin in stool. Of 24 supper attendees eating a chili dish, 14 developed botulism (AR=58.3%, RR=undefined; FET<.001). The chili dish was prepared with Brands A or B frozen chili and Brand C canned chili. Leftover chili from the supper and one unopened container of Brand A chili yielded type A toxin. We identified an additional case of botulism, a Fort Worth resident who consumed Brand A chili but had not attended the church supper. All implicated Brand A chili was purchased in frozen plastic containers at a salvage food store, where foods were subjected to repackaging, and to gross sanitation and temperature abuse. No cases were associated with Brand A chili sold elsewhere.

Conclusions: This large outbreak of botulism was caused by Brand A chili purchased at a salvage food store, where thawing of frozen food may have occurred, allowing production of botulinum toxin. Salvage stores that sort and repackage food may endanger the public's health and require more rigorous supervision.

Key words: botulism, botulinum toxins, food contamination, food handling

Alexander D. Langmuir Lectures, 1972 – 2001

1972 Prevention of Rheumatic Heart Disease C Fact or Fancy.
Charles H. Rammelkamp

1973 Cytomegaloviral Disease in Man: An Ever Developing Problem.
Thomas H. Weller

1974 Hepatitis B Revisited (By the Non-Parenteral Route).
Robert W. McCollum

1975 Origin, Spread, and Disappearance of Kuru: Implications of the Epidemic Behavior of a Disease in New Guineans for the Epidemiologic Study of Transmissible Virus Dementias.
D. Carleton Gajdusek

1976 The Future of Epidemiology in the Hospital.
Paul F. Wehrle

1977 The Historical Evolution of Epidemiology.
Abraham Lilienfeld

1978 The Biology of Cancer: An Epidemiological Perspective.
Sir Richard Doll

1979 The Epidemiology of Antibiotic Resistance.
Theodore C. Eickoff

1980 Health and Population Growth.
Thomas McKeown

1981 The Pathogenesis of Dengue: Molecular Epidemiology in Infectious Disease.
Scott B. Halstead

1982 The Epidemiology of Coronary Heart Disease: Public Health Implications.
Henry W. Blackburn, Jr.

1983 Sexually Transmitted Diseases C Past, Present, and Future.
King K. Holmes

1984 Poliomyelitis Immunization C Past and Future.
Jonas E. Salk

1985 An Epidemiologist=s View of Postmenopausal Estrogen Use, or What to Tell Your Mother.
Elizabeth Barrett-Connor

1986 Hepatitis B Virus and Hepatocellular Carcinoma: Epidemiologic Considerations.
Robert Palmer Beasley

1987 Environmental Hazards and the Public Health.
Geoffrey Rose

1988 Lymphotropic Retroviruses in Immunosuppression.
Myron E. (Max) Essex

1989 Aspirin in the Secondary and Primary Prevention of Cardiovascular Disease.
Charles H. Hennekens

1990 Epidemiology and Global Health.
William H. Foege

1991 Public Health Action in a New Domain: The Epidemiology and Prevention of Violence.
Garen J. Wintemute

1992 *Helicobacter pylori*, Gastritis, Peptic Ulcer Disease, and Gastric Cancer.
Martin J. Blaser

1993 Diet and Health: How Firm Is Our Footing?
Walter C. Willett

1994 Alexander D. Langmuir: A Tribute to the Man.
Philip S. Brachman and William H. Foege

1995 Epidemiology and the Elucidation of Lyme Disease.
Allen C. Steere

1996 50 Years of Epidemiology at CDC.
Jeffrey P. Koplan

1997 Public Health, Population-Based Medicine, and Managed Care.
Diana B. Petitti

1998 Pandemic Influenza: Again?
Robert Couch

1999 The Evolution of Chemical Epidemiology.
Philip J. Landrigan

2000 Does *Chlamydia pneumoniae* Cause Atherosclerotic Cardiovascular Disease? Evaluating the Role of Infectious Agents in Chronic Diseases.
Walter E. Stamm

2001 Halfway Through a Century of Excellence
J. Donald Millar

Alexander D. Langmuir Prize Manuscripts, 1966 – 2001

1966 Complications of Smallpox Vaccination: I. National Survey in the United States, 1963. N Engl J Med 1967;276:125B32.
J.M. Neff, J.M. Lane, J.H. Pert, R. Moore, J.D. Millar, D.A. Henderson

1967 An Outbreak of Neuromyasthenia in a Kentucky Factory C The Possible Role of a Brief Exposure to Organic Mercury. Am J Epidemiol 1967;86:756B64.
G. Miller, R. Chamberlin, W.M. McCormack

1968 Salmonellosis from Chicken Prepared in Commercial Rotisseries: Report of an Outbreak. Am J Epidemiol 1969;90:429B37.
S.B. Werner, J. Allard, E.A. Ager

1969 Outbreak of Tick-Borne Relapsing Fever in Spokane County, Washington. JAMA 1969;210:1045B50.
R.S. Thompson, W. Burgdorfer, R. Russell, B.J. Francis

1970 Tularemia Epidemic:Vermont, 1968 C Forty-Seven Cases Linked to Contact with Muskrats. N Engl J Med 1969;280:1253B60.
L.S. Young, D.S. Bicknell, B.G. Archer, et al.

1971 Tomato Juice-Associated Gastroenteritis, Washington and Oregon, 1969. Am J Epidemiol 1972;96:219B26.
W.H. Barker Jr., V. Runte

1972 Salmonella Septicemia from Platelet Transfusions: Study of an Outbreak Traced to a Hematogenous Carrier of *Salmonella cholerae-suis*. Ann Intern Med 1973;78:633B41.
F.S. Rhame, R.K. Root, J.D. MacLowry, T.A. Dadisman, J.V. Bennett

1973 Outbreak of Typhoid Fever in Trinidad in 1971 Traced to a Commercial Ice Cream Product. Am J Epidemiol 1974;100:150B7.
A. Taylor Jr., A. Santiago, A. Gonzales-Cortes, E.J. Gangarosa

1974 Oyster-Associated Hepatitis: Failure of Shellfish Certification Programs to Prevent Outbreaks. JAMA 1975;233:1065B8.
B.L. Portnoy, P.A. Mackowiak, C.T. Caraway, J.A. Walker, T.W. McKinley, C.A. Klein Jr.

1975 Staphylococcal Food Poisoning Aboard a Commercial Aircraft. Lancet 1975;2:595B9.
M.S. Eisenberg, K. Gaarslev, W. Brown, M. Horwitz, D. Hill

1976 Nursery Outbreak of Peritonitis with Pneumoperitoneum Probably Caused by Thermometer-Induced Rectal Perforation. Am J Epidemiol 1976;104:632B44.
M.A. Horwitz, J.V. Bennett

1977 Epidemic *Yersinia entercolitica* Infection due to Contaminated Chocolate Milk.
N Engl J Med 1978;298:76B9.
R.E. Black, R.J. Jackson, T. Tsai, et al.

1978 Measles Vaccine Efficacy in Children Previously Vaccinated at 12 Months of Age.
Pediatrics 1978;62:955B60.
J.S. Marks, T.J. Halpin, W.A. Orenstein

1979 An Outbreak of Legionnaires= Disease Associated with a Contaminated Air-Conditioning Cooling Tower. N Engl J Med 1980;302:365B70.
T.J. Dondero, Jr., R.C. Rendtorff, G.F. Mallison, et al.
and
Risk of Vascular Disease in Women: Smoking, Oral Contraceptives, Noncontraceptive Estrogens, and Other Factors. JAMA 1979;242:1150B4.
D.B. Petitti, J.Wingerd, J. Pellegrin, et al.

1980 Injuries from the Wichita Falls Tornado: Implications for Prevention. Science 1980;207:734B8.
R.I. Glass, R.B. Craven, D.J. Bregman, et al.

1981 Respiratory Irritation due to Carpet Shampoo: Two Outbreaks. Environ Int 1982;8:337B41.
K. Kreiss, M.G. Gonzalez, K.L. Conright, A.R. Scheere
and
Toxic-Shock Syndrome in Menstruating Women: Association with Tampon Use and *Staphylococcus aureus* and Clinical Features in 52 Cases. N Engl J Med 1980;303:1436B42.
K.N. Shands, G.P. Schmid, B.B. Dan, et al.

1982 Risk Factors for Heatstroke: A Case-Control Study. JAMA 1982;247:3332B6.
E.M. Kilbourne, K. Choi, T.S. Jones, S.B. Thacker

1983 Epidemic Listeriosis C Evidence for Transmission by Food. N Engl J Med 1983;308:203B6.
W.F. Schlech III, P.M. Lavigne, R.A. Bortolussi, et al.

1984 Unexplained Deaths in a Children=s Hospital: An Epidemiologic Assessment.
N Engl J Med 1985;313:211B6.
J.W. Buehler, L.F. Smith, E.M. Wallace, C.W. Heath, R. Kusiak, J.L. Herndon
and
Medication Errors with Inhalant Epinephrine Mimicking an Epidemic of Neonatal Sepsis.
N Engl J Med 1984;310:166B70.
S.L. Solomon, E.M. Wallace, E.L. Ford-Jones, et al.

1985 The Use and Efficacy of Child-Restraint Devices: The Tennessee Experience, 1982 and 1983.
JAMA 1984;252:2571B5.
M.D. Decker, M.J. Dewey, R.H. Hutcheson Jr., W.S. Schaffner

1986 The Role of Parvovirus B19 in Aplastic Crisis and Erythema Infectiosum (Fifth Disease).
J Infect Dis 1986;154:383B93.
T.L. Chorba, P. Coccia, R.C. Holman, et al.

1987 Oral Contraceptives and Cervical Cancer Risk in Costa Rica: Detection Bias or Causal Association? JAMA 1988;259:59B64.
K.L. Irwin, L. Rosero-Bixby, M.W. Oberle, et al.

1988 A Day-Care-Based Case-Control Efficacy Study of *Haemophilus influenzae B* Polysaccharide Vaccine. JAMA 1988;260:1413B8.
L.H. Harrison, C. Broome, A.W. Hightower, et al.

1989 Group A Meningococcal Carriage in Travelers Returning from Saudi Arabia.
JAMA 1988;260:2686B9.
P.S. Moore, L.H. Harrison, E.E. Telzak,, G.W. Ajello, C.V. Broome
and
Transmission of *Plasmodium vivax* Malaria in San Diego County, California, 1986. Am J Trop Med Hyg 1990;42:3B9.
Y.A. Maldonado, B.L. Nahlen, R.R. Roberta, et al.

1990 An Outbreak of Surgical Wound Infections due to Group A Streptococcus Carried on the Scalp.
N Engl J Med 1990;323:968B72.
T.D. Mastro, T.A. Farley, J.A. Elliott, et al.

1991 An Investigation of the Cause of the Eosinophilia-Myalgia Syndrome Associated with Tryptophan Use. N Engl J Med 1990;323:357B65.
E.A. Belongia, C.W. Hedberg, G.J. Gleich, et al.

1992 An Outbreak of Multidrug-Resistant Tuberculosis Among Hospitalized Patients with the Acquired Immunodeficiency Syndrome. N Engl J Med 1992;326:1514B21.
B.R. Edlin, J.I. Tokars, M.H. Grieco, et al.

1993 Comparison of Prevention Strategies for Neonatal Group B Streptococcal Infection: A Population-Based Economic Analysis. JAMA 1993;270:1442B8.
J.C. Mohle-Boetani, A. Schuchat, B.D. Plikaytis, J.D. Smith, C.V. Broome
and
Retrospective Study of the Impact of Lead-Based Hazard Remediation on Children=s Blood Lead Levels in St. Louis, Missouri. Am J Epidemiol 1994;139:1016B26.
C. Staes, T. Matte, C.B. Copley, D. Flanders, S. Binder

1994 A Massive Outbreak in Milwaukee of Crytosporidium Infection Transmitted through the Public Water Supply. N Engl J Med 1994;331:161B7.
W.R. Mac Kenzie, N.J. Hoxie, M.E. Proctor, et al.

1995 A Multistate Outbreak of *Escherichia coli* 0157:H7-Associated Bloody Diarrhea and Hemolytic Uremic Syndrome from Hamburgers: The Washington Experience.
JAMA 1994;272:1349B53.
B.P. Bell, M. Goldoft, P.M. Griffin, et al.

1996 A Multistate Outbreak of *Salmonella enteriditis* Infections Associated with Consumption of Schwann=s Ice Cream. N Engl J Med 1996; 334:1281B6.
T.W. Hennessy, C.W. Hedberg, L. Slutsker, et al.
and
Passenger to Passenger Transmission of *Mycobacterium tuberculosis* Aboard Commercial Aircraft During Transoceanic Travel. N Engl J Med 1996;334:993B8.
T.A. Kenyon, S.E. Valway, W.W. Ihle, I.M. Onorato.

1997 Epidemic Meningococcal Disease and Tobacco Smoke: A Risk Factor Study in the Pacific Northwest. Pediatr Infect Dis J 1997;16:979B83.
M.A. Fisher, K. Hedberg, P. Cardosi, et al.

1998 Suicide After Natural Disasters. N Engl J Med 1998;338:373B8.
E.G. Krug, M. Kresnow, J.P. Peddicord, et al.

1999 Legalized Physician-Assisted Suicide in Oregon C The First Year=s Experience.
N Engl J Med 1999;340:577B583.
A.E. Chin, K. Hedberg, G.K. Higginson, D.W. Fleming

2000 Infantile Hypertrophic Pyloric Stenosis After Pertussis Prophylaxis with Erythromycin: A Case Review and Cohort Study. Lancet 1999;354:2101B5.
M.A. Honein, L.J. Paulozzi, I.M. Himelright, B. Lee, J.D. Cragan, L. Patterson, A. Correa, S. Hall, J. D. Erickson

2001 *Salmonella* Typhimurium Infections Transmitted By Chlorine-Pretreated Clover Sprout Seeds
J.T. Brooks, S. Rowe, P. Shillam, D. Heltzel, S. Hunter, L. Slutsker, R.. Hoekstra, S. Luby

– Awards Presented at the 2001 EIS Conference –

Alexander D. Langmuir Prize Manuscript Award

Salmonella Typhimurium Infections Transmitted By Chlorine-Pretreated Clover Sprout Seeds
John T. Brooks, S. Rowe, P. Shillam, D. Heltzel, S. Hunter, L. Slutsker, R. Hoekstra, S. Luby

Donald C. Mackel Memorial Award

When Beauty Is More Than Skin Deep: An Outbreak of Rapidly Growing Mycobacterial Furunculosis Associated with a Nail Salon C California, 2000
Kevin L. Winthrop, M. Abrams, I. Schwartz, D. Gillies, M. Yakrus, D. Vugia

Outstanding Poster Presentation

Counting Crows: Crow Mortality as a Sentinel for West Nile Virus Disease in Humans C Northeastern United States, 2000
Kathleen G. Julian, A. Marfin, M. Eidson, S. Hinten, J. Miller, E. Bresnitz, M. Bunning, L. Petersen, and the Arbo-NET Surveillance Group

Philip S. Brachman Award

Douglas H. Hamilton

Distinguished Friend of the EIS Award
(Presented by the EIS Alumni/ae Association)

Barbara R. Holloway
William R. Jarvis

Paul C. Schnitker International Health Award

Valerie D. Garrett

Iain C. Hardy Award

Orin S. Levine

James H. Steele Veterinary Public Health Award

Mary-Kathleen Glynn

Committee Members for the 2002 EIS Conference

Alexander D. Langmuir Prize

Alan Hinman **(Chair) (EIS '65)**
Phil Brachman **(EIS '54)**
Jose Cordero **(EIS '79)**
Allen Craig **(EIS '95)**
Amy Curtis **(EIS '97)**
Jim Lando **(EIS '96)**
Daniel M. Sosin **(EIS '86)**

Donald C. Mackel Award

Richard E. Besser **(Chair) (EIS '91)**
Walter R. Daley **(EIS '97)**
Mark A. Pallansch

Poster Session

Megan Davies **(Chair) (EIS '98)**
Lara Akinbami **(EIS '98)**
Nancy T. Gathany

Latebreaker Session

Mary Reichler **(Chair) (EIS '89)**
Jim Buehler **(EIS '81)**
Jeffrey J. Sacks **(EIS '79)**

Paul C. Schnitker Award

Linda A. Valleroy **(Chair) (EIS '91)**
Joanna Buffington **(EIS '90)**
Tim Dondero **(EIS '77)**
Douglas H. Hamilton **(EIS '91)**
Peter Kilmarx **(EIS '94)**
Douglas N. Klaucke **(EIS '79)**
Kayla F. Laserson **(EIS '97)**

Iain C. Hardy Award

Melinda Wharton **(Chair) (EIS '86)**
Susan Y. Chu **(EIS '87)**
Stephen Hadler **(EIS '77)**
Alison C. Mawle
John F. Modlin **(EIS '73)**
William Schaffner **(EIS '66)**

James H. Steele Veterinary Public Health Award

Peter M. Schantz **(Chair) (EIS '74)**
Paul Garbe **(EIS '82)**
Tom Gomez **(EIS '90)**
Hugh Mainzer **(EIS '92)**
Marguerite Pappaioanou **(EIS '83)**
Carol H. Rubin **(EIS '90)**

The 51st Annual Epidemic Intelligence Service Conference
April 22-26, 2002

Centers for Disease Control and Prevention
Atlanta, Georgia

Continuing Education Credits

The Centers for Disease Control and Prevention (CDC) is accredited by the Accreditation Council for Continuing Medical Education, the American Nurses Credentialing Center=s Commission on Accreditation, and the International Association for Continuing Education and Training to sponsor continuing education for physicians, veterinarians, nurses, scientists, epidemiologists, and other professionals. CDC has applied for approval to award 29.75 credit hours in Category I of the Physician=s Recognition Award of the American Medical Association, 35.6 continuing nursing education (CNE) contact hours, and 2.95 continuing education unit (CEU) credits for this continuing education activity.

To register for any of the three categories of continuing education, please go to http://www.phppo.cdc.gov/phtnonline/ and follow the directions for on-line registration and on-line evaluation.

– EIS Class of 2002 –
(As of 3/18/02)

Josef Amann, MD
D. Fermin Arguello, II, MD
Swati Avashia, MD
Lubna I. Bhatti, MBBS
Oleg Bilukha, MD, PhD
Thomas Boo, MD
Karen Broder, MD
Kate Buchacz, PhD, MPH
Kris Carter, DVM, MPVM
Marion W. Carter, MA, PhD
Myrna D. Charles, DO, MBA
Wairimu Chege, MD, MPH
R. Dawn Comstock, PhD, MS
Karen Cowgill, RN, MPH, PhD
Tracy L. Creek, MD
Henraya F. Davis, PhD
Marcia Drees, MD
Wayne Duffus, MD, PhD
Danice K. Eaton, MPH, PhD
Lorena Espinoza, DDS, MPH
Scott Filler, MD
Brendan L. Flannery, PhD, MPH
Aaron T. Fleischauer, PhD, MSPH
LeAnne M. Fox, MD, MPH
Renee Funk, DVM, MPH
Victoria M. Gammino, PhD, MPH
Sami Gottlieb, MD, MSPH
Althea M. Grant, PhD, MPH
Ralph J. Groves, MD, MA
Theresa Harrington, MD, MPH
Margaret K. Herrick, MD, MPH
Gregory Huhn, MD, MPH&TM
Elmira Isakbaeva, MD
Martha Iwamoto, MD
Nidhi Jain, MD, MPH
Asim Jani, MD, MPH
Kathryn Jurgens, MD
Susan ANeely@ Kaydos, PhD, MSPH
Yelena Y. Khromova, MD, MPH
Karen M. Kiang, MD
James C. Kile, III, DVM, MPH
Jan B. King, MD, MPH
Katrina Kretsinger, MD, MA
Nolan E. Lee, MD, MPH
James A. Litch, MD
Virginia S. K. Loo, PhD
George E. Luber, PhD, MA
Michael F. Lynch, MD, MPH
Alexandre Macedo de Oliveria, MD
Susan E. Manning, MD
Mona E. Marin, MD
Melissa A. Marx, PhD, MPH
Jacek Mazurek, MD, MS
Margaret E. McCusker, MD, MS
Jacqueline W. Miller, MD
Abraham G. Miranda, MD
Joel M. Montgomery, PhD
Susan Montgomery, DVM, MPH
Robin Nandy, MBBS, MPH
E. Claire Newbern, MPH, PhD
Dawn M. Norton, PhD
Benjamin J. Park, MD
Sarah Y. Park, MD
Pragna Patel, MD
Priti Patel, MD
Angela J. Peck, MD
LoriA Pollack, MD, MPH
Leigh Ramsey, PhD, MSc
Corwin ACorey@ Robertson, MD, MPH
Marc G. Romney, MD
Nancy M. Sahakian, MD, MPH
Carlos Sanchez, MD
Jeffrey D. Schulden, MD
Nicole Seguy, MD, MPH
Sharmila Shetty, MD
Chad B. Smelser, MD
Alan Smith, MD, MPH
Mark Sotir, PhD, MPH
Shelley Stonecipher, DVM, MPH
Peter E. Thomas, PhD, MPH
Waimar Tun, PhD, MHS
Andrea S. Vicari, DVM, PhD
Tara M. Vogt, PhD, MPH
John T. Watson, MD, MSc
Jean A. Welsh, RN, MPH
Maura K. Whiteman, PhD
David Wong, MD
Jennifer G. Wright, DVM, MPH
Lorraine F. Yeung, MD, MPH